CHAPTER 5 - ALTERNATIVES DEVELOPMENT AND EVALUATION

5.1 ALTERNATIVES EVALUATION

The methodology and criteria used to evaluate Airport facility development alternatives are discussed in this section.

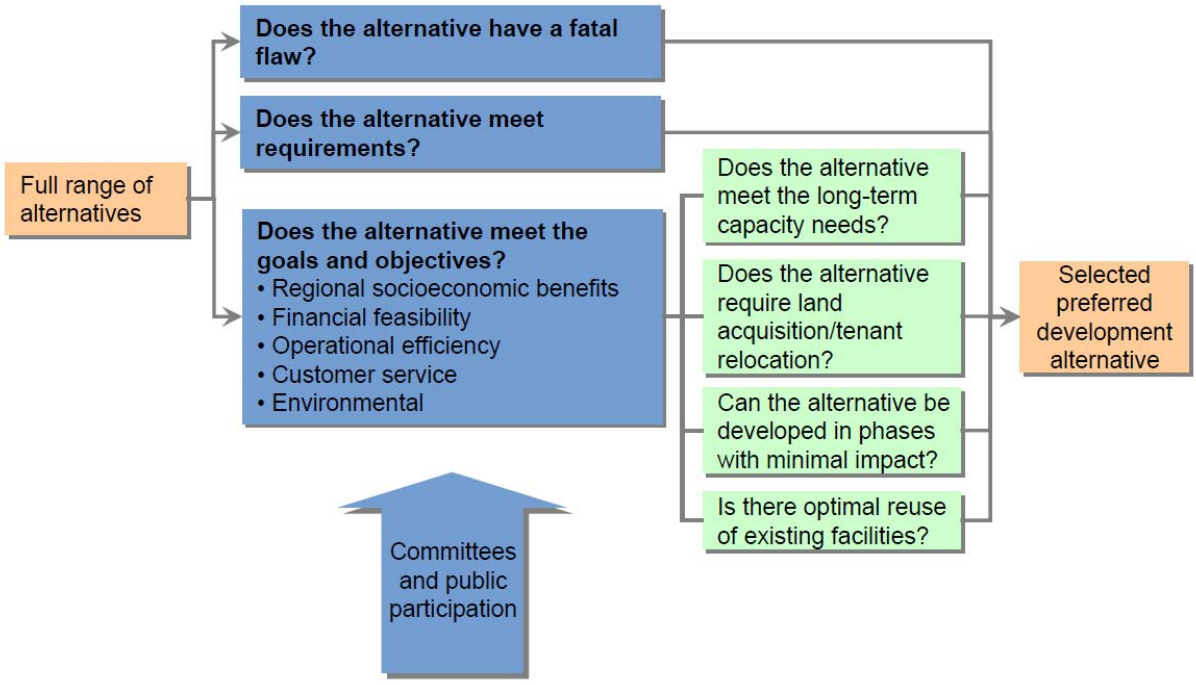
5.1.1 Evaluation Methodology

Airport development alternatives were evaluated to determine the most preferable alternative, one that supports the vision for the Airport and meets the overall goals and objectives for the Master Plan, as delineated in Chapter 1.

The evaluation process accounted for practical concerns – such as constructibility and airspace compatibility – and policy concerns delineated in the goals and objectives. Alternatives were evaluated to determine if they would fully or partially achieve the goals and objectives set forth by the advisory committees.

Alternatives were also evaluated using social, financial, operational, customer service, and environmental factors. The evaluation criteria were developed to be consistent with sustainability principles, encouraging a holistic approach to the planning process, in which economic viability, operational efficiency, natural resource preservation, and social responsibility were considered. The alternatives evaluation process is depicted on **Figure 5-1**.

Figure 5-1: Alternatives Evaluation Methodology



5.1.2 Evaluation Criteria

The criteria used in evaluating the alternatives were both strategic and qualitative to ensure that the evaluation process remained at a master planning level of detail. A number of criteria were specific to either airfield or terminal development alternatives, but, on the whole, the following evaluation criteria were applied generally to all alternatives. Furthermore, the criteria were not weighted. A basic scoring system was used, in which colors were assigned to each alternative as it was assessed against each criterion. If the alternative would not support the criterion (i.e., a negative impact would result), the alternative was assigned the color yellow. If the alternative would make no difference, white (i.e., neutral) was assigned. If the alternative would have a net positive impact, (i.e., create a benefit in line with the goals and objectives), green was assigned. Finally, a "-" indicates that the criterion was not applicable at this level of evaluation. The alternative with the most positives (green) and least negatives (yellow) was deemed the preferred alternative.

The criteria used were:

Regional Socioeconomic Benefits

- Meets 2030 capacity needs
- Allows for long-term growth of terminal/airfield
- Meets runway length requirements
- Optimizes nonterminal land development
- Provides opportunity to serve as a regional gateway
- Supports a regional rail system

Financial Feasibility

- Capital investment requirement
- Ability to develop incrementally
- Opportunities for nonairline revenue
- Requirement for land acquisition

Operational Efficiency

- Airfield configuration optimizes aircraft movement
- Promotes airline staff efficiency
- Roadways, curbside, parking meet capacity needs
- Ease of maintenance
- Flexibility of facility for multiple users
- Minimizes impact of construction phasing

Customer Service

- Minimizes walking distances/vertical movements
- Sufficient space for passenger processing
- Allows for intuitive wayfinding
- Access to rental car facilities

Environmental

- Lifecycle resource use

- Reuse of existing facilities
- Impact on local community
- Preservation of open space

5.2 DEVELOPMENT CONSTRAINTS

Infrastructure and facilities constraints and environmental constraints to Airport development are discussed in this section. A constraints analysis defined the land available for development on the Airport. The results are illustrated on **Figure 5-2**.

5.2.1 Infrastructure and Facilities Constraints

The Airport is landlocked by long-term immovable infrastructure: Loop 410 and U.S. 281 to the west and south, future Wurzbach Parkway to the north, and the Union Pacific Railroad right-of-way to the east.

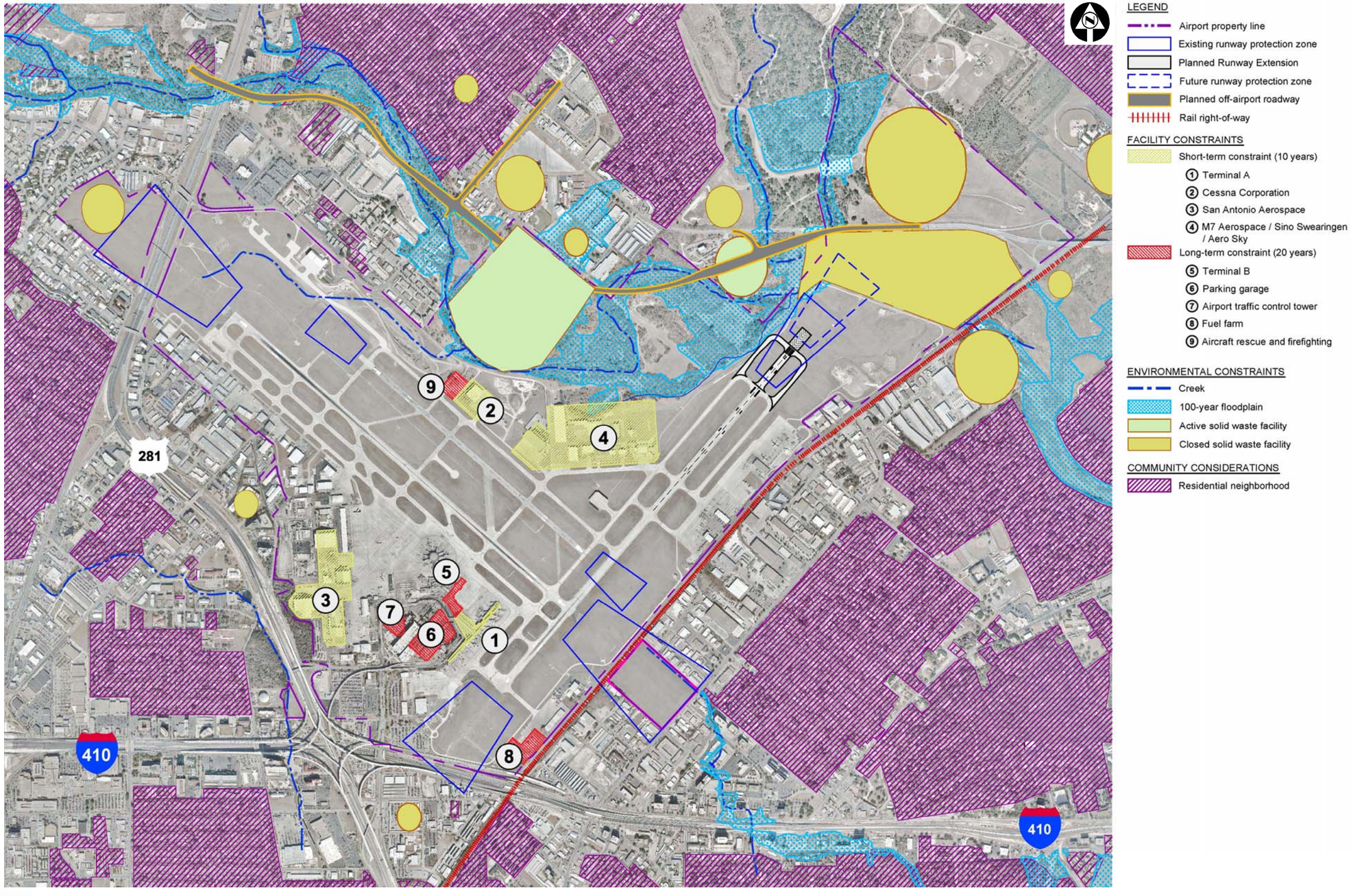
Some on-Airport facilities were designated as constraints to development because of the capital investments they represent, and the financial and operational challenges that relocating them would create. Terminal A and aircraft maintenance and manufacturing facilities were designated as short-term constraints (10 years). Other facilities, such as the parking garages, Terminal B, and FAA facilities, were considered to be long-term constraints (20 years).

5.2.2 Environmental Constraints

Most environmental constraints on the Airport are concentrated north of the airfield, a relatively undeveloped area with creeks, floodplains, and waste facilities. These environmentally sensitive areas need to be considered when planning future Airport development.

- An area (approximately 475 acres) on the north side of the Airport is listed by the Federal Emergency Management Agency as a 100-year floodplain and a smaller adjacent area lies within the 500-year floodplain. According to FAA requirements, all airport development actions must avoid floodplains to the extent practicable. Any significant encroachment on the floodplain requires extensive environmental assessment to obtain FAA, state, and local approval before proposed development can proceed.
- Several either closed or active municipal waste facilities are located on Airport property north of the airfield. These sites would require cleanup and disposal activities in compliance with State and local health and safety regulations before they can be developed.

Figure 5-2: Development Constraints



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5.3 AIRFIELD DEVELOPMENT ALTERNATIVES

The airfield development alternatives were designed to address the long-term airfield needs defined in Chapter 4, with a goal of illustrating and evaluating the full range of potential development opportunities. The improvements included in the preferred alternative would be implemented over the next 20 years and potentially beyond. Improvements would be implemented when justified by aviation demand and when funding is secured.

5.3.1 Development Alternatives

Each alternative considered includes the following targeted airfield improvements outlined in Chapter 4:

- Rehabilitate Runway 12R-30L[1] and add 35-foot-wide shoulders
- Add 20-foot-wide shoulders for Runway 12L-30R[2]
- Upgrade and/or construct blast pads for Runways 12R, 12L, and 30R
- Add and upgrade taxiways and add taxiway shoulders where needed
- Construct high speed exits on Runways 3 and 30L
- Address aircraft circulation restrictions on the Terminal A apron
- Obtain control of property in the RPZs in the current and future runway configurations
- Add a CAT I ILS on Runway 21
- Add an RNAV approach to Runways 12L and 30R
- When available, upgrade the runway approaches using NextGen technology, such as optimized profile descent and/or other performance-based navigation to be introduced by the FAA
- Provide a runway with sufficient length (10,000 feet – 11,500 feet) to support long-haul international service
- Widen and lengthen Runway 12L-30R to air carrier standards

The City is currently extending Runway 3-21 1,000 feet to the north and constructing parallel Taxiways N and Q. This project is included in the baseline facilities for this analysis. The facilities that are affected by the runway extension include the perimeter road, security fencing, FAA navigational aids, utilities, and the NE Entrance Road. Future Wurzbach Parkway was also included in the baseline facilities, and any impacts to the Parkway were considered in the alternatives evaluation.

Terminal A Taxilane Improvements

Some locations on the Terminal A apron do not have adequate spacing to accommodate ADG IV or ADG V aircraft. Each alternative includes improvements to the apron area to address the terminal taxilane restrictions, shown on **Figure 5-3**. Paving the grass islands located directly northeast and southeast of Terminal A and restriping the taxilane that parallels Taxiway G would enable ADG IV or ADG V aircraft to operate unrestricted. Shifting the southernmost portion of Taxiway N 50 feet to the southeast, thereby reducing the Runway 3-21 centerline to Taxiway N centerline separation from 450 feet to 400 feet would enable ADG IV aircraft to access the gates at Terminal A. FAA Air Traffic Control has implemented operating procedures to prevent runway

[1] Runway 12R-30L must be rehabilitated within the planning period to maintain its operability.
[2] This improvement will be implemented only if the preferred alternative does not include upgrading Runway 12L-30R.

incursions on Runway 3-21. These procedures would still be enforced after construction of the recommended improvements to the Terminal A apron.

Taxiway Improvements and High-Speed Exits

Significant taxiway improvements in several areas of the airfield are planned to optimize future ADG IV and ADG V aircraft movements.

Taxiway E does not meet ADG V standards. The existing navigational aids that are a constraint to upgrading the taxiway are being relocated as part of the current Runway 3-21 extension project. Once this project is completed, Taxiway E can be widened to 75 feet with 35-foot-wide shoulders, as depicted on Figure 5-3, to accommodate ADG V requirements. Associated drainage requirements will also have to be met when the taxiway is upgraded.

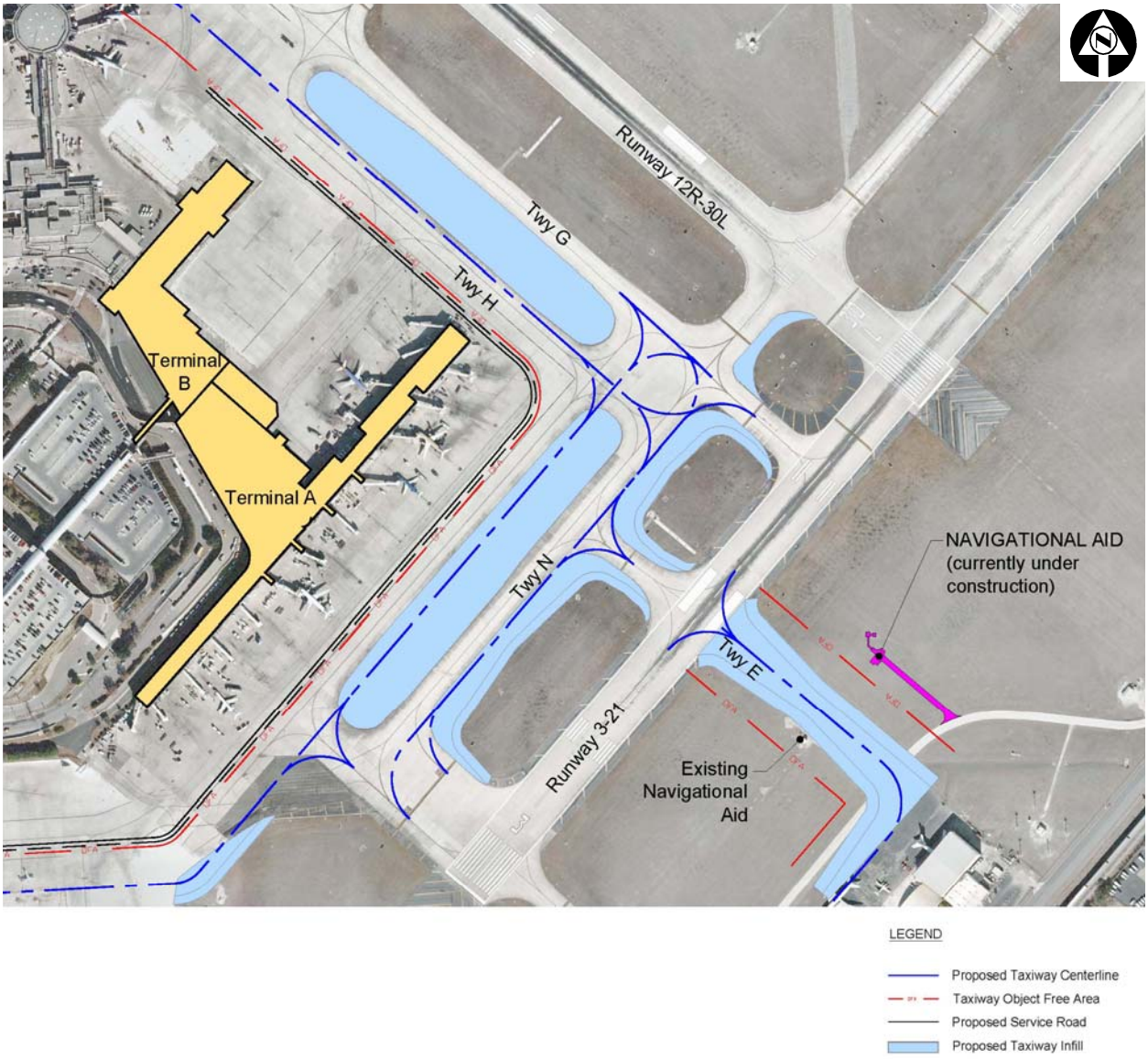
Taxiway B does not meet the 15-foot safety margin for ADG V aircraft exiting Runway 30L. Constructing a taxiway fillet would improve the turn for ADG V aircraft. The same condition exists with Taxiway L, but the distance from the beginning of Runway 30L to the Taxiway L exit is too short to allow a safe exit at high speeds.

Taxiway Q also requires a fillet to allow pilots to maneuver aircraft safely between the East Cargo facility and Taxiway Q.

To ensure optimal use of the runways, high-speed exits should be constructed on Runway 3-21 between Taxiways T and D for Runway 3 approaches and between Taxiways T and R for Runway 21 approaches. A high-speed exit should also be constructed between Taxiways S and B for Runway 30L approaches. The high-speed exit analysis is included in **Appendix G**.

In addition to constructing high-speed exits, the portion of Taxiway B located between Taxiways G and H should be removed. The removal of this taxiway is prompted by the SAT ATCT and the FAA Engineering Brief No. 75: *Incorporation of Runway Incursion Prevention into Taxiway and Apron Design*, published on November 19 2007. The main purpose of the Brief is to ensure the avoidance of taxiway layouts that provide straight, direct access onto a runway from a terminal or parking apron area. It is recommended that the airport be constructed with a geometry that promotes situational awareness by requiring pilots to execute turns. Removal of the proposed section of Taxiway B would deter pilots of departing aircraft from inadvertently proceeding directly onto Runway 12R-30L.

Figure 5-3: Terminal Area Taxilane Improvements



Other taxiway improvements will be phased for implementation with or prior to the upgrade of Runway 12L-30R to air carrier standards. These improvements include:

- Elevate and strengthen Taxiway RC and widen it from 50 feet to 75 feet
- Widen and strengthen Taxiway J between Runways 12R-30L and 12L-30R
- Improve fillets along Taxiways A, D, and N between Runways 12L-30R and 12R-30L
- Close or remove Taxiways M and P
- Strengthen Taxiway A to accommodate dual tandem aircraft between Runway 12R-30L and Taxiway R
- Upgrade Taxiway E to ADG V standards

Taxiways recommended for strengthening should be upgraded to accommodate a single-wheel-type landing gear at a weight bearing capacity of 95,000 pounds, dual-wheel-type landing gear at a weight bearing capacity of 190,000 pounds, and dual wheels in a tandem-type landing gear at a weight bearing capacity of 270,000 pounds.

The majority of SAT's taxiways are designed to meet ADG IV standards. However, as the design aircraft for the Airport is changing to ADG V, a pavement analysis should be conducted to determine when pavement rehabilitation may be required.

Additional taxiway modifications may be required based on Airport tenant requirements. The airfield development alternatives considered are described below.

Airfield Alternative 1 – No Build

As shown on **Figure 5-4**, under Airfield Alternative 1, the airfield would remain in its current configuration. The only improvements would be the upgrades required to meet FAA standards, the construction of high-speed exits, and the Terminal A taxilane improvements. In addition, the Aviation Department would obtain control of approximately 6 acres of land located within the RPZ at the end of Runway 3 through acquisition or avigation easement.

Airfield Alternative 2 – Extend Runway 12R-30L to 10,500 Feet

As shown on **Figure 5-5**, under Airfield Alternative 2, Runway 12R-30L would be extended by approximately 2,500 feet to the northwest, bringing the runway length to 10,500 feet. The northwest runway extension would require a taxiway and runway bridge over U.S. 281. Construction of this bridge would significantly affect traffic on U.S. 281. The runway extension and associated shift of the RPZ and ILS would require property acquisition.

This alternative also includes decoupling Runways 12R-30L and 3-21 by relocating the Runway 30L threshold 500 feet north to allow independent operation of the two runways.

Figure 5-4: Airfield Alternative 1

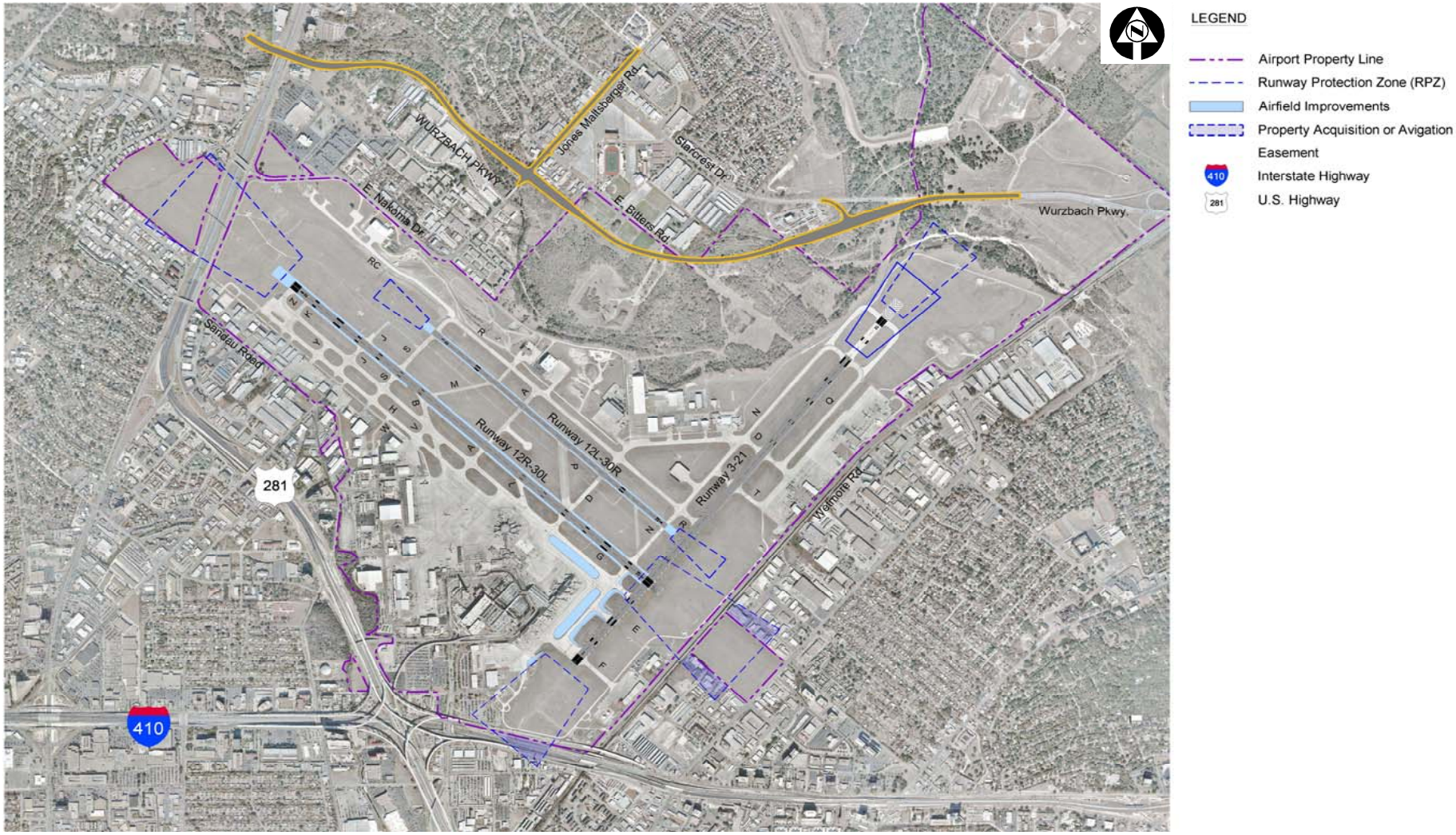


Figure 5-5: Airfield Alternative 2

Airfield Alternative 3 – Extend Runway 12R-30L to 8,850 Feet

Under Airfield Alternative 3, Runway 12R-30L would be extended 850 feet to the northwest and the Runway 30L threshold would be relocated 500 feet to the northwest, resulting in a total runway length of 8,850 feet (see **Figure 5-6**). Relocating the Runway 30L landing threshold would allow independent operation of Runways 12R-30L and 3-21. The Runway 12R threshold would remain in its existing location to avoid relocating the navigational aids and approach lighting system. Declared distances for Runways 12R and 30L would be as follows:

	Runway 12R	**Runway 30L**
Takeoff run available (TORA)	8,850 feet	8,850 feet
Takeoff distance available (TODA)	9,050 feet	9,050 feet
Accelerated stop distance available (ASDA)	9,050 feet	9,050 feet
Landing distance available (LDA)	8,000 feet	8,850 feet

This extension would not affect U.S. 281; however, the departure RPZ, RSA, and ROFA would affect private property.

Airfield Alternative 4 – Extend Runway 12R-30L to 10,200 Feet

As shown on **Figure 5-7**, under Airfield Alternative 4, Runway 12R-30L would be extended 1,700 feet to the southeast, bringing the total runway length to 10,200 feet. The extension would affect Wetmore Road and the Union Pacific Railroad right-of-way. The runway extension and associated shift of the RPZ and ILS would require property acquisition.

Airfield Alternative 5 – Extend Runway 3-21 to 11,500 Feet

Under Airfield Alternative 5, Runway 3-21 would be extended to the northeast as far as possible while keeping the RSA and ROFA within Airport property, as shown on **Figure 5-8**. The runway would be extended approximately 3,000 feet, for a total runway length of 11,500 feet. This alternative would require modifications to the proposed Wurzbach Parkway. It would also affect the Joint Cities LRB and Wetmore Road landfills. In addition, the terrain near the Runway 21 threshold slopes down toward the northeast, thus requiring a considerable amount of fill to meet runway design standards. The runway extension and associated shift of the RPZ and ILS would also require either property acquisition or an easement.

Figure 5-6: Airfield Alternative 3

Figure 5-7: Airfield Alternative 4

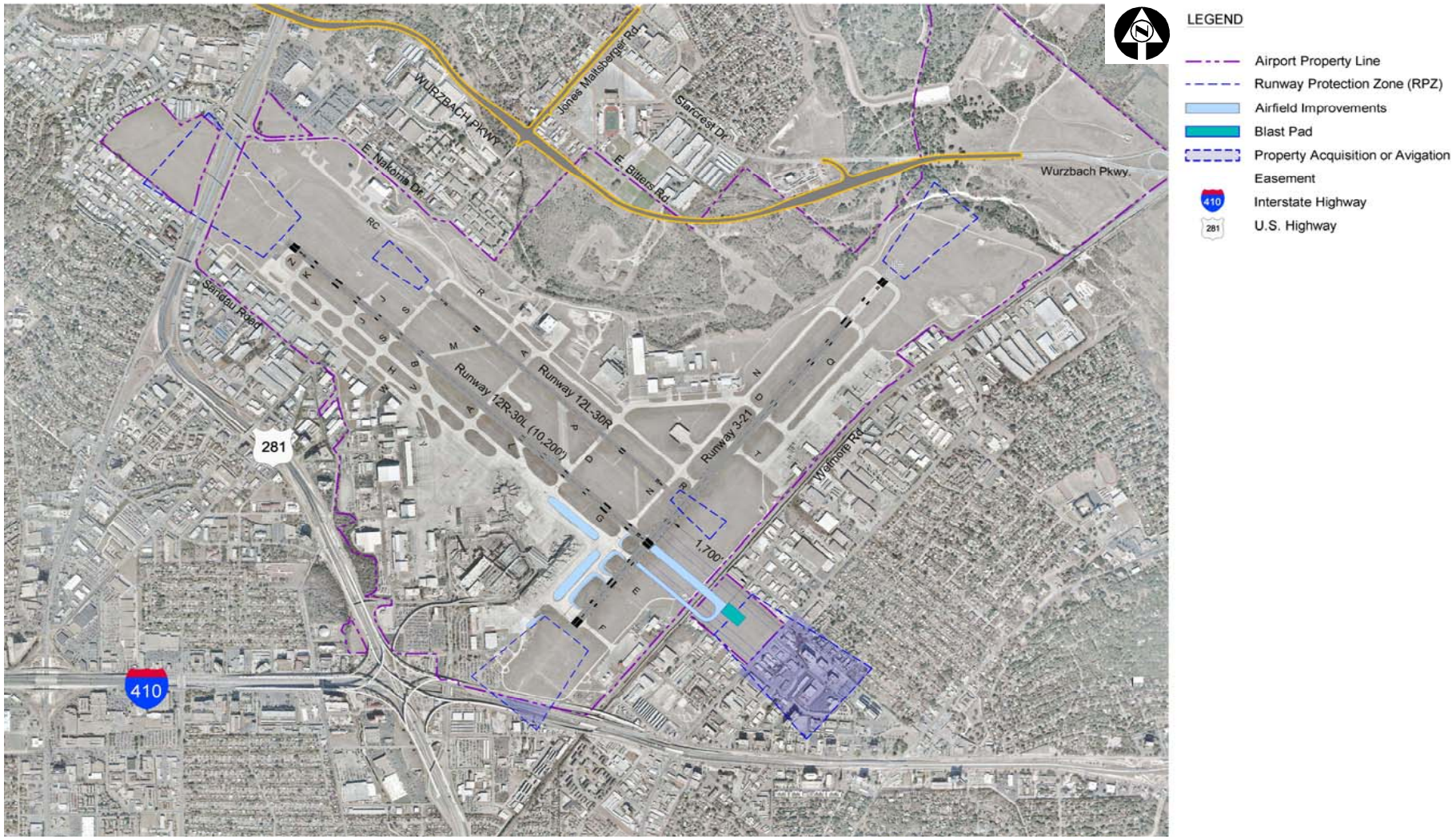
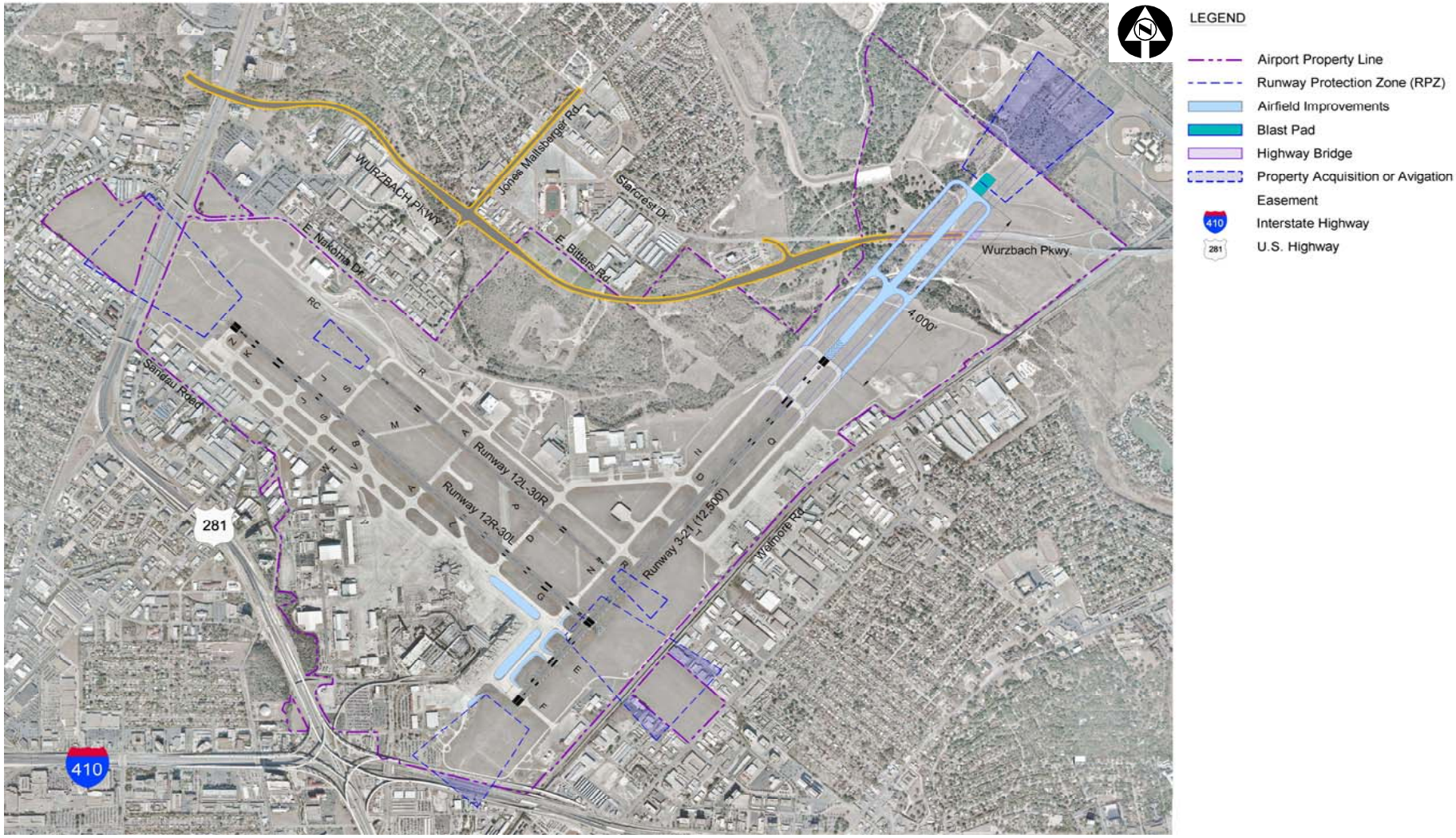


Figure 5-8: Airfield Alternative 5



Airfield Alternative 6 – Extend Runway 3-21 to 10,000 Feet

As shown on **Figure 5-9**, under Airfield Alternative 6, Runway 3-21 would be extended to the northeast while keeping the RPZ, RSA, and ROFA on Airport property. The runway would be extended approximately 1,500 feet, for a total runway length of 10,000 feet. This alternative is similar to Airfield Alternative 5, but the shorter extension under Alternative 6 would not affect the proposed Wurzbach Parkway, the Joint Cities LRB, or the Wetmore Road landfills. However, because of the declining slope of the terrain, the extension would require a considerable amount of fill to meet runway design standards. This alternative would allow the City to select any of the alternatives and phase them for development well beyond the planning horizon.

Airfield Alternative 7 – Upgrade/Extend Runway 12L-30R to 11,000 Feet

Under this alternative, Runway 12L-30R would be extended to 11,000 feet and upgraded to full air carrier aircraft capability. Similar to Airfield Alternative 2, the runway extension to the northwest would require construction of a bridge over U.S. 281, as shown on **Figure 5-10**. This alternative would significantly affect U.S. 281. The runway extension and associated shift of the RPZ and ILS would require the acquisition or easement of off-Airport property. Approximately 2,000 feet of E. Nakoma Drive would need to be relocated out of the proposed RSA and ROFA for Runway 12L-30R and realigned to connect with the access road to U.S. 281.

Airfield Alternative 8 – Upgrade/Extend Runway 12L-30R to 8,500 Feet

As shown on **Figure 5-11**, Airfield Alternative 8 is a variation of Airfield Alternative 7. Under this alternative, the general aviation runway would be upgraded to air carrier standards by increasing its width to 150 feet and extending it by 3,000 feet, thereby providing an 8,500-foot-long runway. This runway extension is significantly shorter than the extension under Airfield Alternative 7 to keep the RSA and ROFA on Airport property. The runway extension and associated shift of the RPZ would affect off-Airport property.

Under this alternative, Runways 12R-30L and 3-21 would be decoupled to allow independent operation, which would increase capacity and reduce the risk of runway incursions. Runway 12R-30L would be shifted 450 feet to the northwest. The Runway 12R landing threshold would remain in its existing location, therefore creating a displaced threshold for Runway 12R since the runway would be extended by 450 feet, in order to minimize relocation of the navigational aids and approach lighting system. Relocation of the localizer would be unavoidable, as it would be within the RSA. Furthermore, with the runway extension, approximately 0.03 acre of the ROFA would affect a perimeter road on the northwest end of the runway. Declared distances for Runways 12R and 30L would be as follows:

	Runway 12R	**Runway 30L**
Takeoff run available (TORA)	8,500 feet	8,500 feet
Takeoff distance available (TODA)	8,700 feet	8,700 feet
Accelerated stop distance available (ASDA)	8,700 feet	8,700 feet
Landing distance available (LDA)	8,050 feet	8,500 feet

Figure 5-9: Airfield Alternative 6

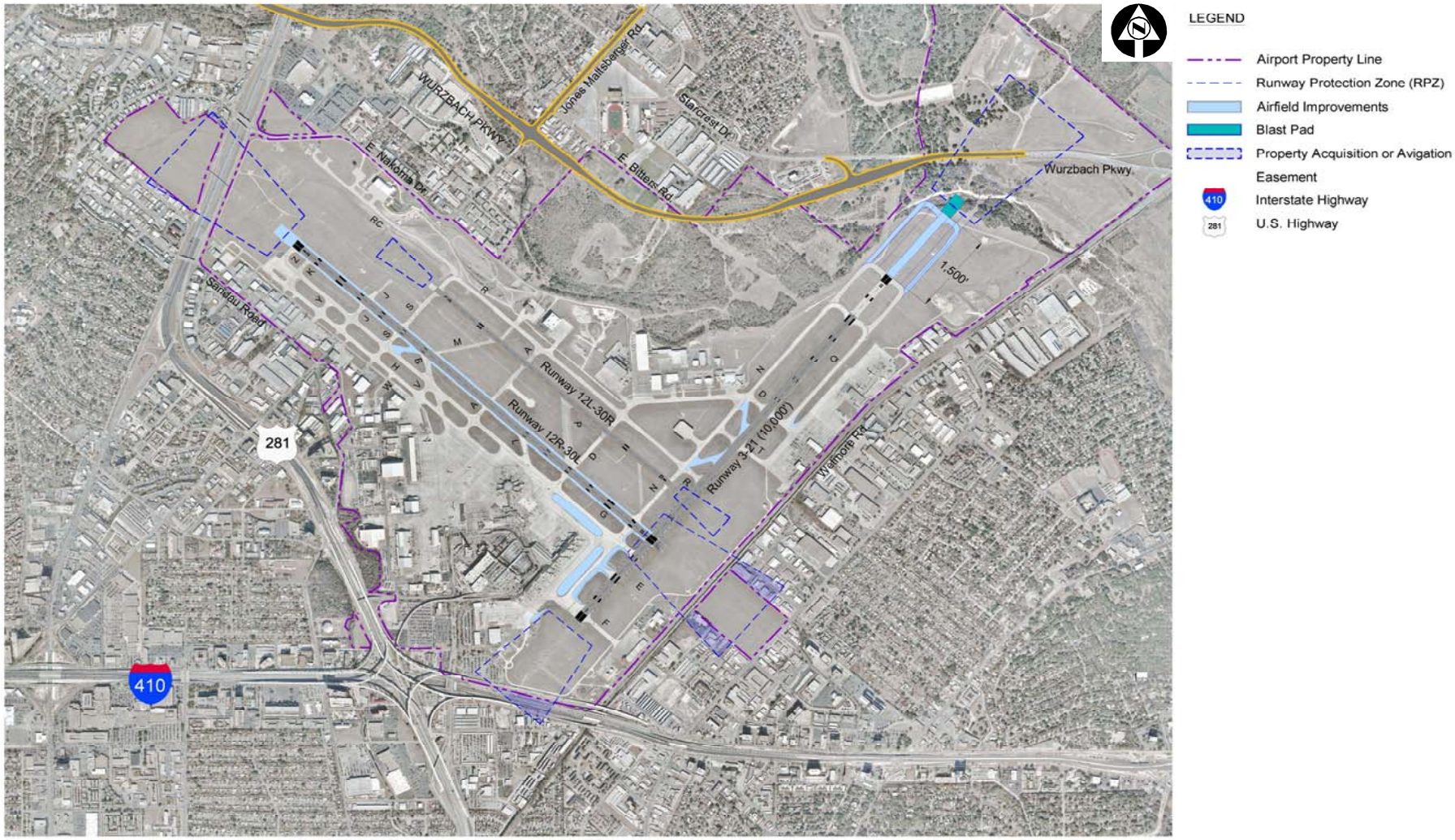


Figure 5-10: Airfield Alternative 7

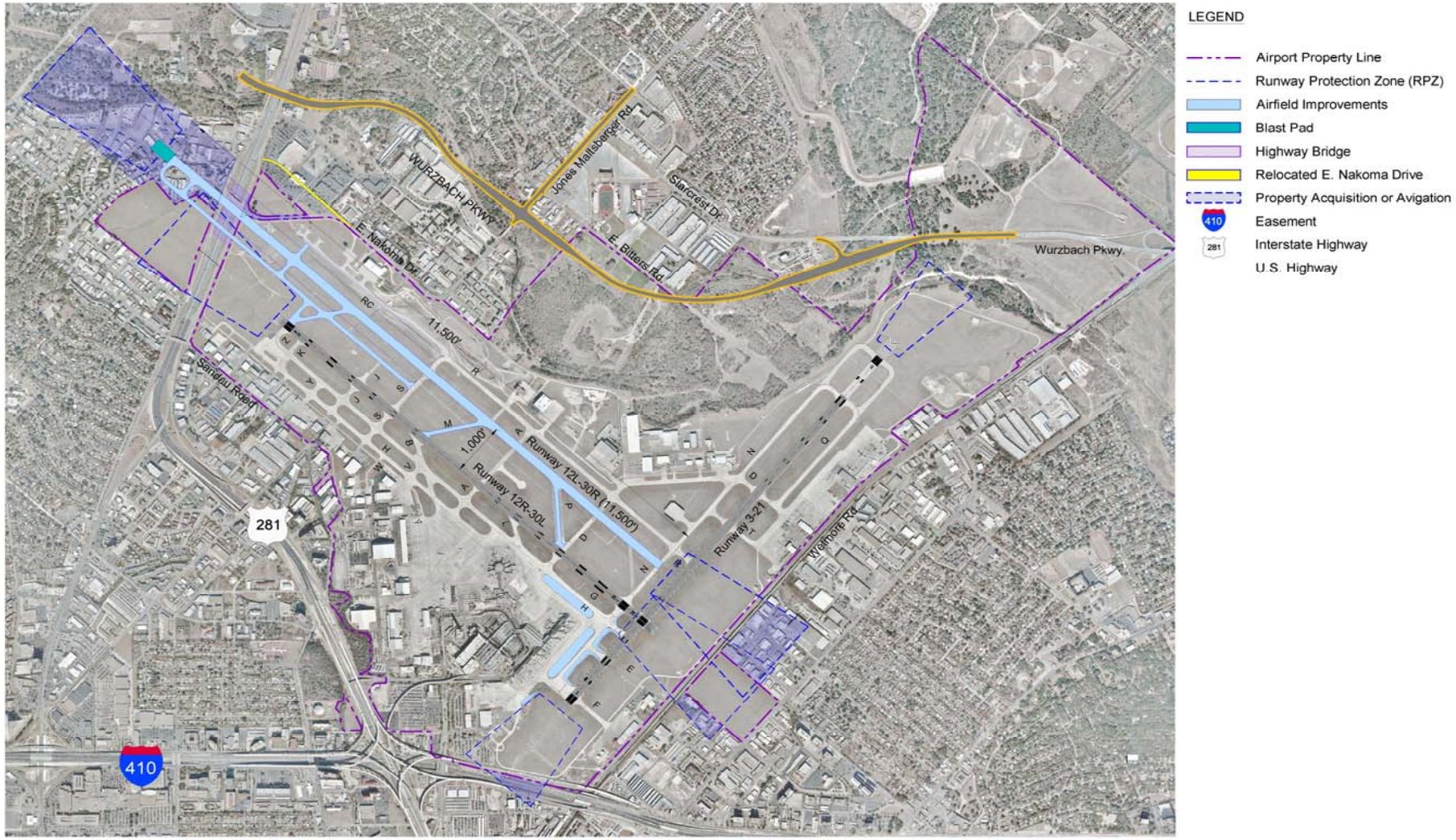
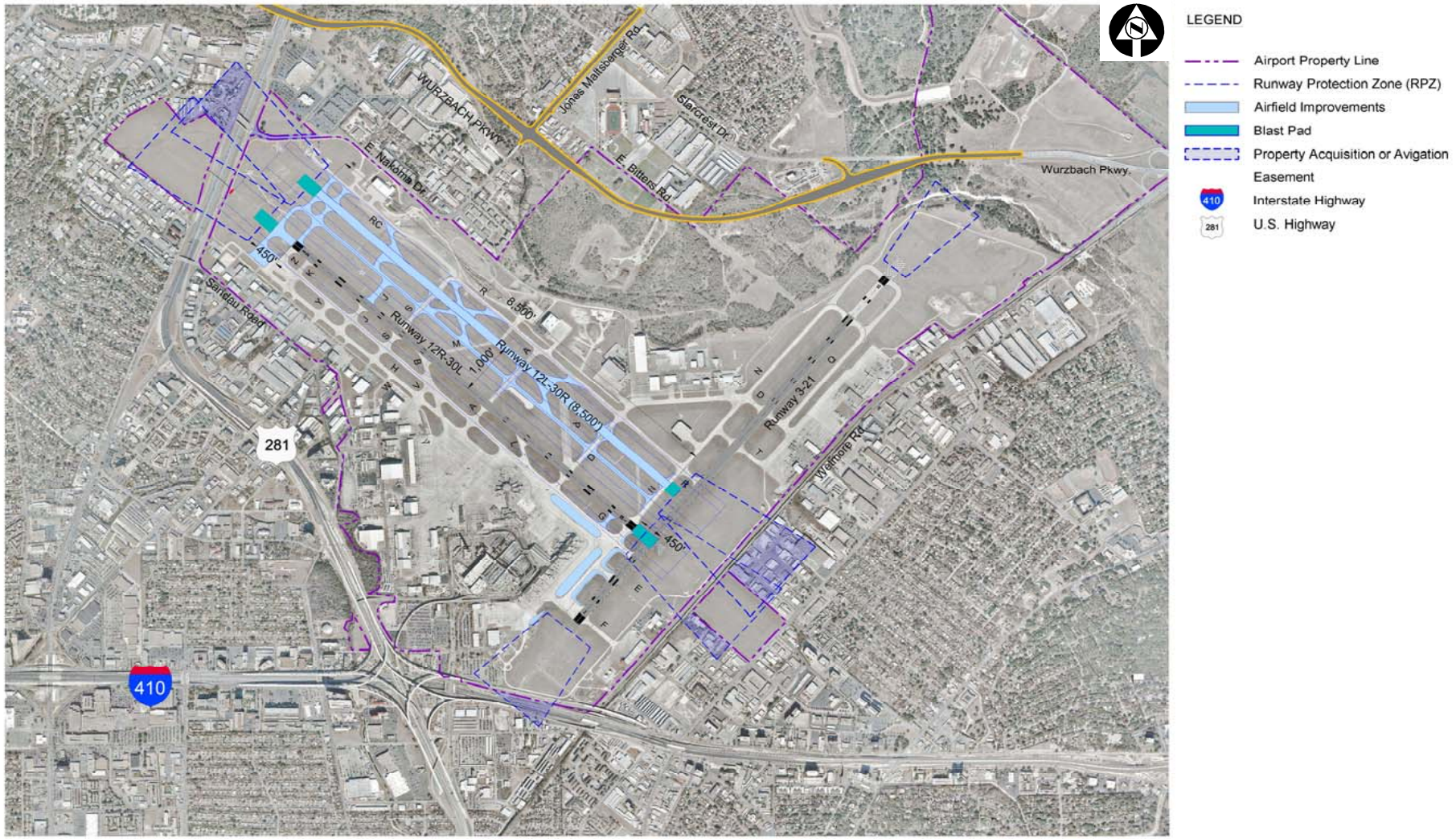


Figure 5-11: Airfield Alternative 8



Airfield Alternative 9 – Extend Runway 12L-30R to 10,000 Feet

As shown on **Figure 5-12**, Airfield Alternative 9 is a blend of Airfield Alternatives 7 and 8. Under Airfield Alternative 9, the general aviation runway would be upgraded to air carrier standards by increasing its width to 150 feet and extending its length by 2,980 feet to the northwest and 1,500 feet to the southeast, resulting in a 10,000-foot-long runway. The RSA and ROFA at the northwest end would remain on Airport property; however, E. Nakoma Drive would have to be relocated. On the southeast end, a portion of the Runway 30R RPZ would affect Wetmore Road, the railroad, and several acres of off-Airport property.

Airfield Alternative 10 – Upgrade/Extend Runway 12L-30R to 11,000 Feet

As shown on **Figure 5-13**, Airfield Alternative 10 is similar to Airfield Alternative 9; however, under Airfield Alternative 10, Runway 12L-30R would be extended 2,500 feet to the southeast. Under this alternative, the general aviation runway would be upgraded to air carrier standards by increasing its width to 150 feet and extending its length to 11,000 feet; 2,980 feet to the northwest and 2,500 feet to the southeast. The RSA and ROFA on the northwest end of the runway would remain on Airport property; however, a portion of E. Nakoma Drive would have to be relocated. On the southeast end of the runway, the extension would require property acquisition or an easement, the relocation of Wetmore Road, and relocation of the railroad tracks.

Airfield Alternative 11 – Extend Runway 12L-30R to 8,500 Feet and Runway 12R-30L to 11,500 Feet

As shown on **Figure 5-14**, Airfield Alternative 11 is a variation of Airfield Alternatives 3, 4 and 8. Under this alternative, Runway 12L-30R would be upgraded to air carrier standards and extended to 8,500 feet. The runway extension would keep the RSA and ROFA on Airport property. A portion of the Runway 30R RPZ would penetrate private property and E. Nakoma Drive would need to be relocated out of the proposed RSA and ROFA.

Also included under this alternative is the extension of Runway 12R-30L to the southeast by 2,650 feet and to the northeast by 350 feet, for a total runway length of 11,500 feet. The runway, the RPZ, and the ILS would affect Wetmore Road, the railroad right-of-way, and several acres of private property.

Figure 5-12: Airfield Alternative 9

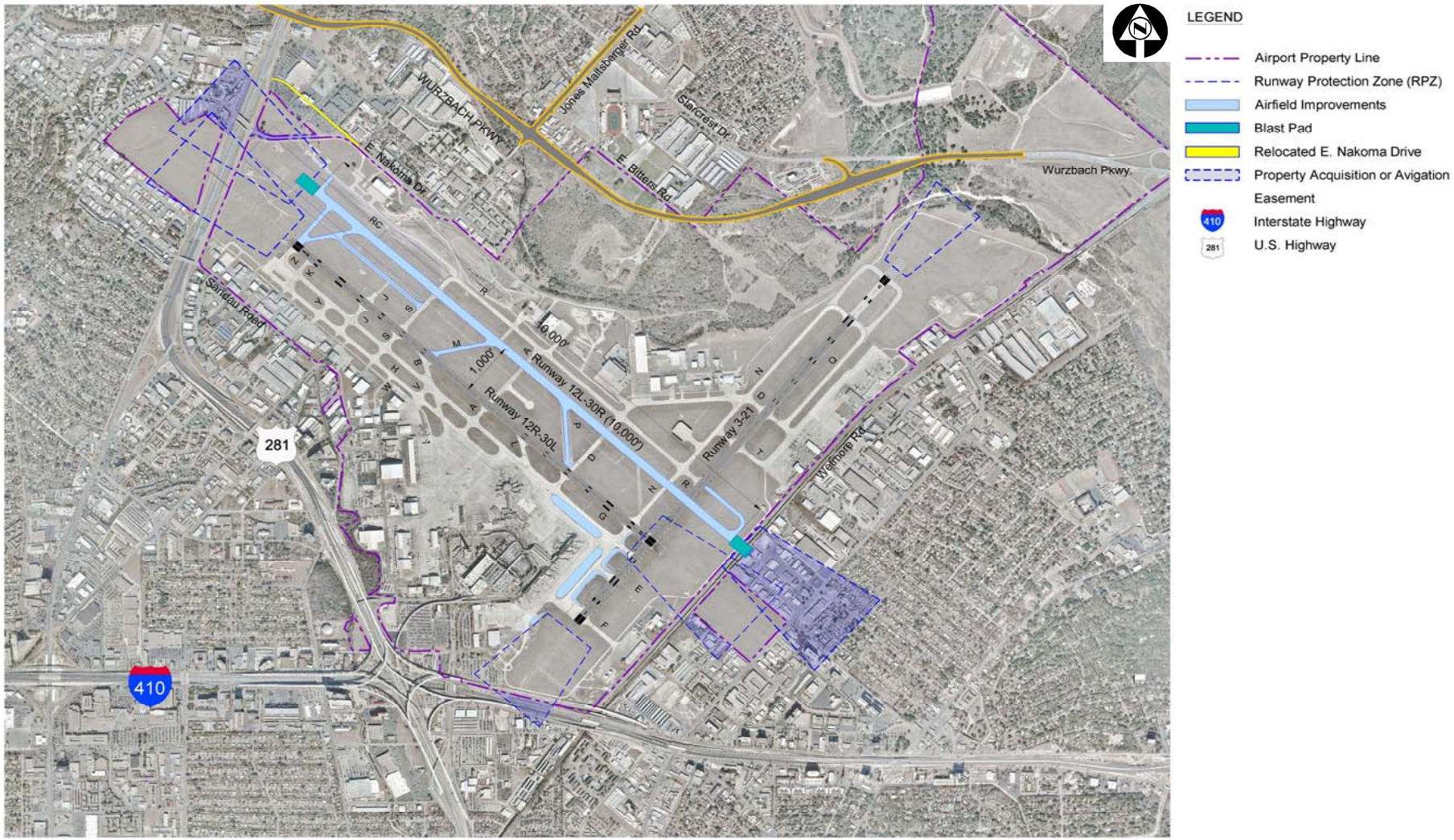


Figure 5-13: Airfield Alternative 10

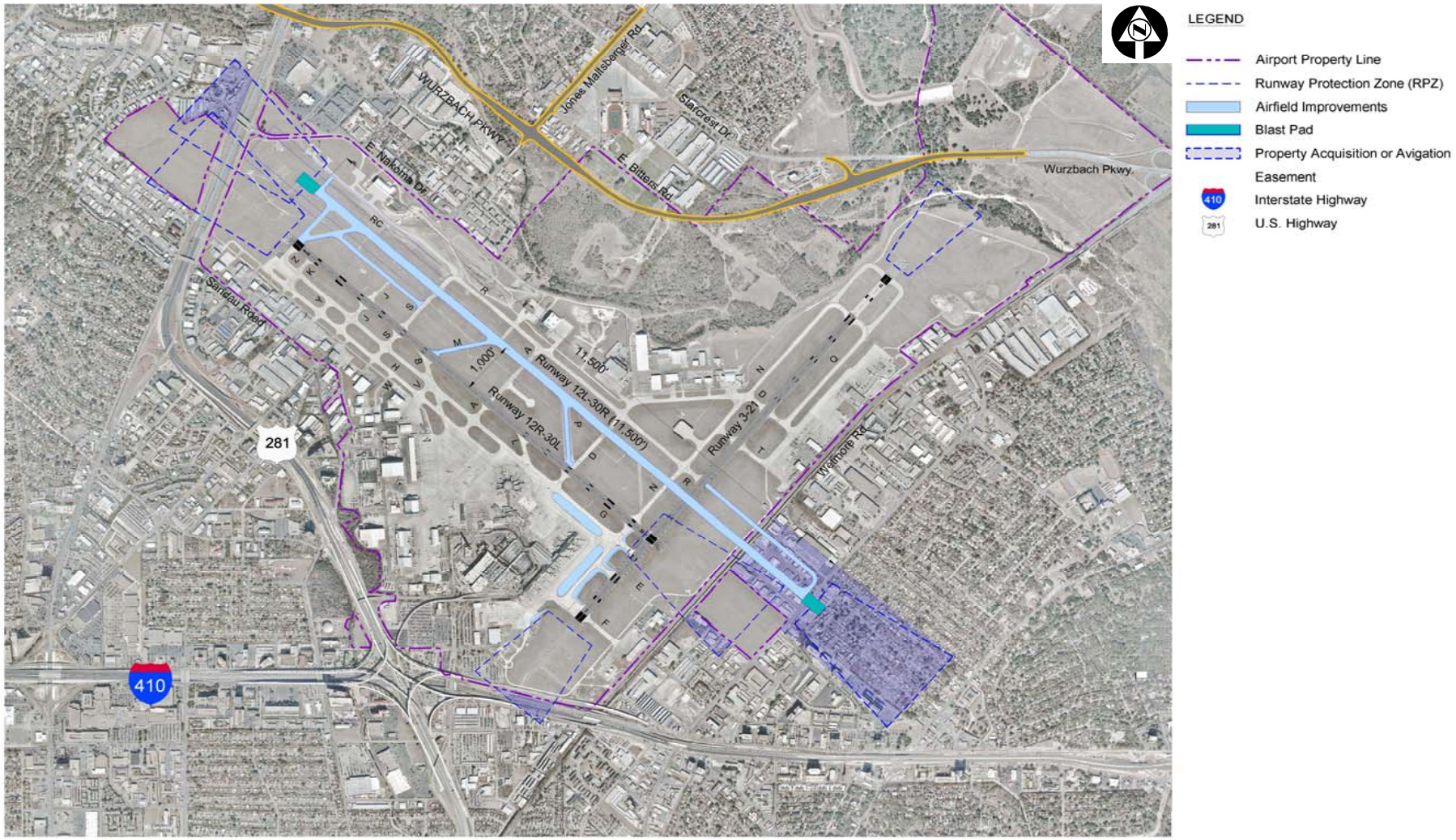
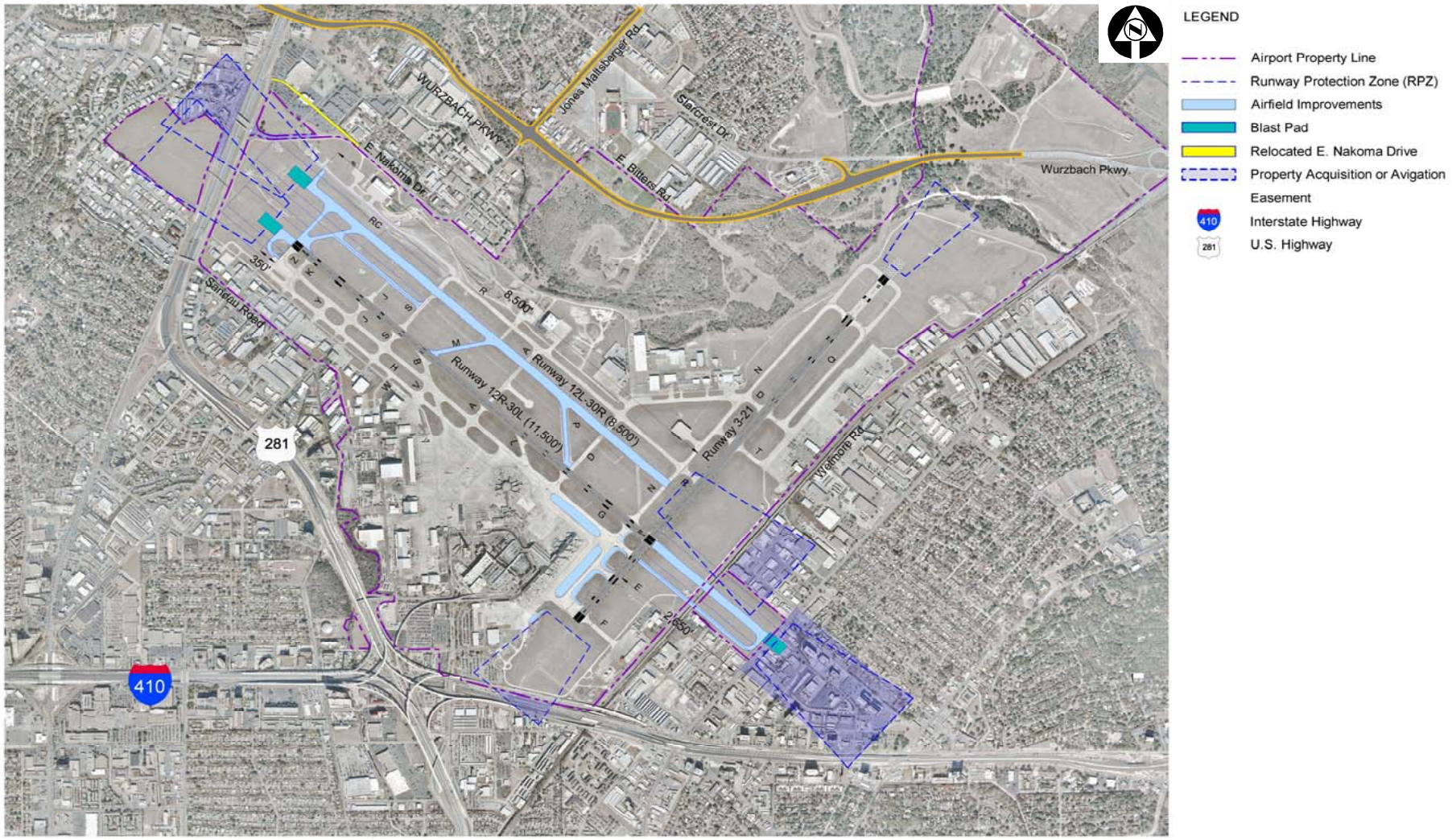


Figure 5-14: Airfield Alternative 11



5.3.2 Alternatives Evaluation

The results of the airfield alternatives evaluation are presented in **Table 5-1** and described below.

Table 5-1: Evaluation of Airfield Alternatives

	Airfield Alternatives										
	1	2	3	4	5	6	7	8	9	10	11
Regional Socioeconomic Benefits											
Meets 2030 capacity needs	○	●	○	●	●	●	●	●	●	●	●
Allows long term growth of terminal / airfield	●	●	●	●	●	●	●	●	●	●	●
Meets runway length requirements	◐	○	◐	○	○	○	○	◐	○	○	○
Optimizes nonterminal land development	●	●	●	○	●	●	●	●	●	●	○
Provides opportunity to serve as a regional gateway	-	-	-	-	-	-	-	-	-	-	-
Supports a regional rail system	●	●	●	◐	●	●	●	●	◐	◐	◐
Financial Feasibility											
Capital investment requirement	●	◐	○	◐	◐	◐	◐	○	◐	◐	◐
Ability to develop incrementally	●	◐	○	◐	●	○	●	○	●	●	●
Opportunities for nonairline revenue	-	-	-	-	-	-	-	-	-	-	-
Requirement for land acquisition	●	◐	●	◐	○	●	◐	○	◐	◐	◐
Operational Efficiency											
Airfield configuration optimizes aircraft movement	○	○	○	○	○	○	●	○	○	○	●
Promotes airline staff efficiency	-	-	-	-	-	-	-	-	-	-	-
Roadways, curbside, parking meet capacity needs	-	-	-	-	-	-	-	-	-	-	-
Ease of maintenance	◐	◐	○	◐	○	○	●	●	●	●	●
Flexibility of facility for multiple users	-	-	-	-	-	-	-	-	-	-	-
Minimizes impact of construction phasing	○	◐	◐	◐	○	○	◐	●	○	◐	◐
Customer Service											
Minimizes walking distances / vertical movements	-	-	-	-	-	-	-	-	-	-	-
Sufficient space for passenger processing	-	-	-	-	-	-	-	-	-	-	-
Allows for intuitive wayfinding	-	-	-	-	-	-	-	-	-	-	-
Access to rental car facilities	-	-	-	-	-	-	-	-	-	-	-
Environmental											
Lifecycle resource use	-	-	-	-	-	-	-	-	-	-	-
Reuse of existing facilities	-	-	-	-	-	-	-	-	-	-	-
Impact on local community	●	◐	○	◐	●	●	◐	○	◐	◐	○
Preservation of open space	●	○	○	○	◐	◐	○	○	○	○	○

● Meets criterion
○ Neutral
◐ Does not meet criterion

Airfield Alternative 1– No Build

This alternative was carried forward for further study, as all alternatives must begin at this phase. This alternative would allow the City to select any of the alternatives for future development.

Airfield Alternative 2 – Extend Runway 12R-30L to 10,500 Feet

Airfield Alternative 2 would satisfy the Airport's long-term airfield facility requirements, but the runway extension to the northwest would create significant impacts on the surrounding communities and infrastructure. The alternative would require significant capital investment for construction of the runway bridge over U.S. 281 and the need for land acquisition. Airfield Alternative 2 was therefore eliminated from further consideration.

Airfield Alternative 3 – Extend Runway 12R-30L to 8,850 Feet

Airfield Alternative 3 was eliminated from further consideration as it would not meet the runway length requirement.

Airfield Alternative 4 – Extend Runway 12R-30L to 10,200 Feet

Airfield Alternative 4 would satisfy the Airport's long-term capacity and runway length requirements, but extension of the runway to the southeast would create significant impacts on Wetmore Road and the railroad right-of-way. This alternative would also require the acquisition of land located in the future RPZ. This alternative was eliminated from further consideration because of the impacts noted above and the high capital investment required for construction and property acquisition.

Airfield Alternative 5 – Extend Runway 3-21 to 11,500 Feet

Airfield Alternative 5 would satisfy the Airport's long-term capacity and runway length requirements, but it would impact Wurzbach Parkway and was, therefore, eliminated from further consideration.

Airfield Alternative 6 – Extend Runway 3-21 to 10,000 Feet

This alternative was carried forward for further study because it satisfies most of the evaluation criteria. This alternative would also allow the City to select any of the alternatives and phase them for development well beyond the planning period for the Master Plan.

Airfield Alternative 7 – Upgrade/Extend Runway 12L-30R to 11,000 Feet

Airfield Alternative 7 would satisfy the Airport's long-term facility requirements, but the extension of Runway 12L-30R to the northwest would create significant impacts on the surrounding communities and infrastructure. The alternative would require significant capital investment for construction of the runway bridge over U.S. 281 and the need for land acquisition. Therefore, this alternative was eliminated from further consideration.

Airfield Alternative 8 – Upgrade/Extend Runway 12L-30R to 8,500 Feet

This alternative was carried forward for further study because it satisfies most of the evaluation criteria. Although this alternative would not satisfy the runway length requirements criterion, it would allow the City to select any of the alternatives and phase them for development well beyond the planning period for this Master Plan.

Airfield Alternative 9 – Extend Runway 12L-30R to 10,000 Feet

Airfield Alternative 9 would satisfy the Airport's long-term capacity and runway length requirements. However, the extension of Runway 30L to the southeast would affect Wetmore Road and the railroad right-of-way. This alternative would also require the acquisition of land located in the future RPZ. Therefore, this alternative was eliminated from further consideration because of the impacts noted above and the high capital investment required for construction/property acquisition.

Airfield Alternative 10 – Upgrade/Extend Runway 12L-30R to 11,000 Feet

Airfield Alternative 10 would satisfy the runway length requirements, but would also affect Wetmore Road and the railroad right-of-way. This alternative would also require property acquisition or an easement for the RPZ. Therefore, this alternative was eliminated from further consideration because of the impacts noted above and the capital investment required.

Airfield Alternative 11 – Extend Runway 12L-30R to 8,500 Feet and Runway 12R-30L to 11,500 Feet

Airfield Alternative 11 would satisfy the runway length requirements, but it would also affect Wetmore Road and the railroad right-of-way. Property acquisition or an easement for the RPZ would also be required. Therefore, this alternative was eliminated from further consideration because of the impacts noted above and the capital investment required.

Airfield Alternatives Carried Forward

Of the 11 airfield alternatives evaluated, three were carried forward (Airfield Alternatives 1, 6, and 8)**;** the following conclusions were reached:

- Each alternative addresses the need for future expansion of the airfield to provide a runway extension capable of serving a European market (10,000 feet). Although Airfield Alternatives 1 and 8 would not directly result in a 10,000-foot-long runway, they provide the flexibility to provide that runway length when required.
- Alternatives 6 and 8 will be combined, as these alternatives represent a good blend of increased safety, increased operational flexibility, slight increase in capacity, and provision for the runway length needed to serve a European market.

5.3.3 Recommendation

After the airfield alternatives were evaluated, it was determined that a combination of Alternatives 6 and 8 would present the best solution to addressing the airfield requirements (see **Figure 5-15)**.

The preferred alternative is to extend Runway 3-21 by 1,500 feet to the northeast to a total of 10,000 feet, which would achieve the length required to provide direct service to the European market. The RPZ, RSA, and ROFA would remain on Airport property and the proposed approach surface (50:1) would not affect the proposed alignment of Wurzbach Parkway. In addition, the Joint Cities LRB and Wetmore Road landfills would not be affected by the runway extension.

The preferred alternative presents a significant design challenge. The current Runway 21 threshold elevation is 757 feet above MSL, including the ongoing runway extension. The elevation in the area is approximately 740 feet above MSL. Therefore, a considerable volume of fill would be required to elevate the runway end and associated taxiways to comply with FAA design standards.

The preferred alternative also includes an upgrade to Runway 12L-30R to air carrier standards. The runway would be reconstructed at 8,500 feet long and 150 feet wide. This alternative would shift the runway centerline 10 feet to the northeast to provide 1,000 feet of separation between the two parallel runways. The runway extension is such that the RSA and ROFA would remain within Airport property and would not affect E. Nakoma Drive. However, the RPZs for Runways 30R and 12L would affect approximately 25 acres and 18 acres, respectively, of industrial property.

A full-length parallel taxiway would be constructed between Runways 12L-30R and 12R-30L. Runway 12L-30R would be configured with high-speed exits and connector taxiways to optimize runway efficiency.

Improvements to Runway 12R-30L are recommended to eliminate the intersection with Runway 3-21. The Runway 30L threshold would be relocated approximately 450 feet to the northwest. The pavement on the Runway 12R end would be replaced. However, because of the cost associated with relocating the approach lighting system, the Runway 12R landing threshold would remain in its current location. Declared distances for Runways 12R and 30L would be as follows:

	Runway 12R	**Runway 30L**
Takeoff run available (TORA)	8,500 feet	8,500 feet
Takeoff distance available (TODA)	8,700 feet	8,700 feet
Accelerated stop distance available (ASDA)	8,700 feet	8,700 feet
Landing distance available (LDA)	8,050 feet	8,500 feet

Operational improvements associated with this new configuration include widening Taxiway N southwest of the new threshold of Runway 30L. This increase in width mirrors the improvements proposed near Terminal A and would allow pilots to use the entire runway without maneuvering the aircraft through a difficult turn onto Runway 30L.

With the Runway 30L end decoupled from Runway 3-21, larger aircraft would access Runway 30L via Taxiway N. A new taxiway for general aviation aircraft would be constructed parallel to Taxiway N, providing two access points onto Runway 30L. The new taxiway would be located so as to avoid wake vortex delay for general aviation aircraft. Without the taxiway, FAA ATC would give departing general aviation aircraft an additional delay when following the departure of a large aircraft. The standard general aviation departure procedure following a large aircraft

would be to rotate prior to the larger aircraft's rotation point and fly above the larger aircraft's wake vortex.

Taxiways G and H would be extended to the new end of Runway 12L. This area would be paved to allow additional aircraft queuing to Runway 12R. A high-speed exit would be located across from Taxiway L leading to the new center taxiway. This taxiway would be constructed to allow cargo aircraft a quick exit toward the cargo area without crossing the end of Runway 30L or using the entire runway to turn onto Taxiway N. New blast pads would be constructed on the runway ends.

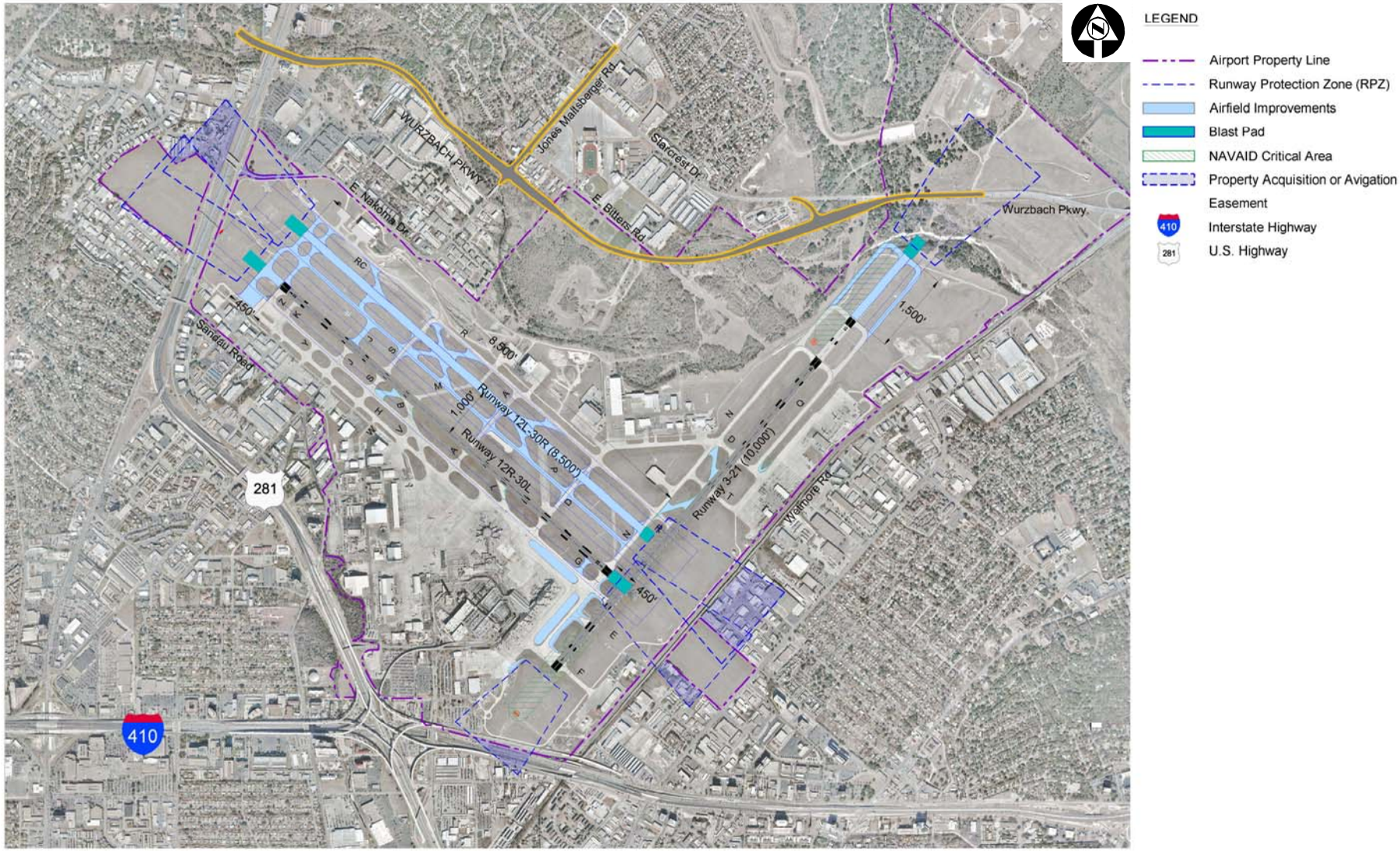
The localizer on the Runway 12R end would be relocated approximately 400 feet to the northwest near the perimeter road so that it would remain clear of the RSA.

It is estimated that approximately 1 acre within the new Runway 12R RPZ and approximately 22 acres within the new Runway 30L RPZ would need to be acquired by the City or avigation easements would need to be established. Most of this property is used for industrial activities.

This alternative was endorsed by ATC as it would provide the controllers the flexibility to direct arrivals to Runway 12L and departures to Runway 12R, assuming that a CAT I approach is constructed for Runway 12L. With three air carrier runways, the Airport is less at risk to experience aircraft diversions resulting from aircraft incidents on the runways. A portion of the RPZ for Runway 30R would affect private property.

The preferred alternative also addresses high-speed exits on Runways 3 and 30L, Terminal A restrictions on Taxiways G and N, obtaining control of property within the RPZs in the current and future configurations, and adding a CAT I ILS on Runway 21. Further analysis will be needed to accommodate an ILS on Runway 21 because approaching traffic would cross the path of Randolph Air Force Base traffic.

Figure 5-15: Preferred Airfield Alternative



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5.3.4 Airfield Capacity

The existing runway capacity in IFR conditions when aircraft land on Runway 12R and depart from Runway 3 is the same as in a single runway configuration when calculated using the Airport Capacity Model (ACM)[3]. The peak hourly capacity of the Airport is roughly 49 - 50 operations per hour under IFR conditions, depending upon the arrival percentage. One concern with the use of this configuration is that the pilot of an aircraft landing on Runway 12R has the authority to use the entire runway, including the location where Runway 12R intersects Runway 3. ATC procedures can be implemented to alleviate this concern.

ATC personnel can clear a departure on Runway 3 with an aircraft landing on Runway 12R if the pilot of the aircraft arriving on Runway 12R acknowledges the departure and the responsibility for maintaining aircraft separation. Previously, separation was ensured through a land and hold short operation (LAHSO), with pilots acknowledging that they would remain short of Runway 3. However, LAHSOs are no longer used at SAT.

Another method to clear a departure on Runway 3 with an aircraft landing on Runway 12R is for ATC to direct the pilot of the landing aircraft to exit the runway prior to the end of the runway and advising the pilot of an impending departure on Runway 3. When the arriving pilot acknowledges the instructions and the impending departure traffic, the departing aircraft can be cleared for departure on Runway 3. Additionally, the controller has the ability to clear the aircraft for departure on Runway 3 when it is apparent that the arrival on Runway 12R will not be a collision hazard for the departing aircraft.

In the preferred alternative, Runways 3-21 and 12R-30L would be decoupled by relocating the Runway 30L threshold 450 feet to the northwest such that the runway end point would be clear of the Runway 3-21 RSA. However, the Runway 12R-30L RSA would extend 1,000 feet beyond the end of the runway. Peak hourly capacity would increase slightly compared with the existing theoretical capacity calculated by the ACM. When compared with actual capacity, the capacity increase would be even smaller, approximately seven peak hour operations. The ACM diagrams do not specifically address this minor increase, nor does the Advisory Circular method. An approximate analysis was performed using ACM diagram 24.

The second part of the preferred alternative is to upgrade Runway 12L-30R to an air carrier runway. The capacity gain is measurable using the ACM and would allow for 11 additional operations in the peak hour during IFR conditions (totaling a capacity of 60 hourly operations in IFR conditions). Runways 12L-30R and 12R-30L would operate as dependent runways; one for arrivals, the other for departures. The runways would be dependent because the missed approach airspace must be protected from the departing aircraft and its wake turbulence until the landing aircraft has safely touched down. However, as the aircraft would be on separate runways, the departing aircraft could be cleared onto the runway and wait in position until the landing aircraft touches down, which results in a capacity gain. **Table 5-2** shows the estimated capacity in IFR conditions for the projected 2030 aircraft fleet mix based on the runways in use.

[3] Defined in FAA AC 150/5060-5, *Airport Capacity and Delay,* dated September 23, 1983

Table 5-2: Estimated IFR Hourly Capacity using Projected 2030 Fleet Mix

	Arrival Runway	Departure Runway	IFR Hourly Capacity (number of operations)
Existing Configuration	12R	12R	49
	12R	3	49
	30L	30L	49
	3	3	49
Decoupled Runway 3	12R	12R	49
	12R	3	57
	30L	30L	49
	3	3	49
	3	30L	57
Upgraded Runway 12R-30L	12L	12R	60
	30R	30L	60
	12L	3/12R	65
	3	3	49
	3	30L	57
	21	21	49
	21	30L	57

In addition to the increase in peak hourly capacity during IMC, the preferred alternative would provide other benefits. The decoupling of Runways 3-21 and 12R-30L would provide two safety benefits. Decoupling the runways would reduce the potential for runway incursions by eliminating the intersection of the two runways. By converting the pavement between the end of Runway 30L to a blast pad with the appropriate distinctive markings, the potential that a pilot would taxi onto Runway 3-21 without clearance using that entrance would be reduced. Additionally, the end points of Runways 30L and 30R would be more closely aligned, lessening the possibility of confusion.

The second benefit is that separating the runways would decrease pilot and controller workload. This would be a safety improvement because the pilots of aircraft holding for departure on Runway 3 cannot see aircraft on Runway 12R, as the line of sight is blocked by the terminal building. Radio transmissions would be reduced and there would be less miscommunication opportunities because the controller would no longer be required to receive a response from the pilot.

Upgrading Runway 12L-30R to an air carrier runway would provide for smoother Airport operation, which has been a goal of air traffic controllers for several years. Having two parallel air carrier runways would provide convenience, even though the runway separation would only be 1,000 feet. In addition to the small capacity increases in IFR conditions shown in **Table 5-2**, the Airport could be operated in multiple directions to accommodate nearly any wind direction and still have more capacity than with the existing layout. This flexibility is one of the benefits of the preferred alternative. Air traffic controllers would favor aircraft landings on Runway 12L and departures on Runway 12R as the preferred operating scenario. This scenario would allow a simple operating plan with a preferred crossing of the departure runway at the departure end. Departures would not have to cross a runway to depart on Runway 12L or Runway 3.

This second air carrier runway in the predominant wind direction would also allow normal Airport operations if Runway 12R-30L were closed for any reason. With the current Airport layout, an aircraft or vehicle incident near the intersection of the two runways would result in closure of the entire Airport. Eliminating the runway intersection would allow the Airport to remain open. With the current runway layout, the only approach to Runway 21 is a global positioning system (GPS) approach. On a few occasions, a closure of Runway 12R-30L with winds out of the south or southwest has resulted in the diversion of scheduled air carrier aircraft because no compatible instrument approach to Runway 21 was available. The diverted aircraft could not land on Runway 3 because of tailwind conditions. As part of the extension of Runway 3-21, a precision approach system to Runway 21 should be installed to prevent these diversions from occurring in the future.

5.4 COMMERCIAL PASSENGER TERMINAL DEVELOPMENT ALTERNATIVES

A detailed analysis of the short-term improvements in Terminal A is outside the scope of this Master Plan. The City will be conducting a separate analysis to determine the most appropriate short-term terminal improvements. However, a preliminary analysis was conducted to determine feasible alternatives for interior improvements to Terminal A. The results of this analysis are discussed below.

The terminal development analysis is a critical step in the master planning process to ensure that the Airport has the necessary terminal capacity to accommodate forecast demand. The terminal development alternatives discussed in this report were developed using industry standards, applicable FAA guidelines, and specific requirements set forth by the Aviation Department. Two planning periods were considered for terminal development: short-term and long-term. The short-term terminal improvements are those that would be modified from the baseline terminal facilities in their existing locations to better use the functional areas and to reduce passenger congestion during peak periods. The long-term terminal development improvements refer to new terminal construction required to accommodate long-term gate demand.

The findings from Chapter 4 showed that the baseline terminal capacity at the Airport is reasonably adequate in the short-term; however, some functional areas of Terminal A are undersized and require expansion. A primary objective of the alternatives analysis was to determine when the baseline facilities in Terminals A and B could no longer meet passenger and tenant level of service requirements, and would, therefore, require the construction of a new terminal facility (referred to hereafter as Terminal C). In the short-term planning period, several key areas of Terminal A were identified for modification/expansion to provide more efficient passenger flows and potentially delay the requirement for new Terminal C. These modifications are discussed in Section 5.4.1. The long-term terminal development alternatives are discussed in Section 5.4.2.

5.4.1 Short-term Terminal A Improvements

Two key functional areas of Terminal A were identified as significant chokepoints in the passenger flow process. Existing shortfalls at these key terminal functions have been confirmed by high congestion during peak periods. Primary problem areas are the passenger security screening checkpoint and the domestic baggage claim area. Secondary terminal functional areas were also identified for expansion, but do not directly affect passenger throughput; these

include gate holdrooms, airline operations space, and secure and nonsecure concessions. The proposed terminal modifications will affect both the departures level and the arrivals level. Reconfiguring these areas will affect several adjacent terminal functions; however, these effects are necessary and relatively minimal. The majority of displaced terminal functions will be replaced with the secondary terminal expansions.

Departures Level Improvements

Chapter 4 indicates a current requirement of 9,000 square feet of space for the passenger security screening checkpoint in Terminal A versus the 6,400 square feet of space currently provided for the six screening lanes. This requirement is projected to increase to 10,500 square feet and seven screening lanes by 2015. The primary passenger circulation improvements recommended for the departures level are related to expanding the undersized passenger security screening checkpoint by approximately 4,500 square feet, as depicted on **Figure 5-17.** Expanding the checkpoint would require displacing a portion of the nonsecure concessions, secure concessions, and the ticket lobby. The displaced nonsecure concessions should be relocated to either the existing AirTran Airways ticket counter area or the existing vacant airline ticket offices. AirTran Airways' ticket counter area can be relocated to the primary ticket counters by reclaiming and consolidating areas that were previously occupied by the bag screening devices. If determined to be economically justified, the secure concessions displaced by expansion of the checkpoint could be relocated to the proposed terminal expansion area just beyond the checkpoint. The building infill adjacent to Gate 6 would add approximately 1,000 square feet of holdroom space. The terminal area south of Gate 3 could also be expanded to accommodate an additional 3,100 square feet of secure concessions space, as shown on **Figure 5-16**. It should be noted that all recommended infills need to be vetted during the design process, as it presents significant construction challenges and requires upgrading of the utility systems. The existing exit from the secure side of the concourse is to be reconfigured by displacing a small portion of the existing excess ticket counters and airline ticket offices.

The facilities requirements analysis indicates that the total gate holdroom space is appropriately sized. If the holdrooms are too small on an individual basis for the aircraft they serve, they can be expanded as a short-term terminal improvement. Approximately 3,150 square feet are available by infilling the apron area between the sterile corridors of Gates 10 and 11, as shown on Figure 5-17. The sterile corridor at Gate 10 could be reconfigured/reoriented south to connect with the Gate 11 sterile corridor. The north end of the concourse could also be infilled at Gate 6 to gain an additional 1,000 square feet of holdroom space. Expansion on the south end of the concourse by approximately 17,000 square feet would accommodate the holdrooms and support spaces for two proposed gates, Gates 17 and 18, if required, as shown on **Figure 5-18**. The additional gates are discussed in greater detail later in this section.

Figure 5-16: Terminal A Departures Level Improvements – North Concourse

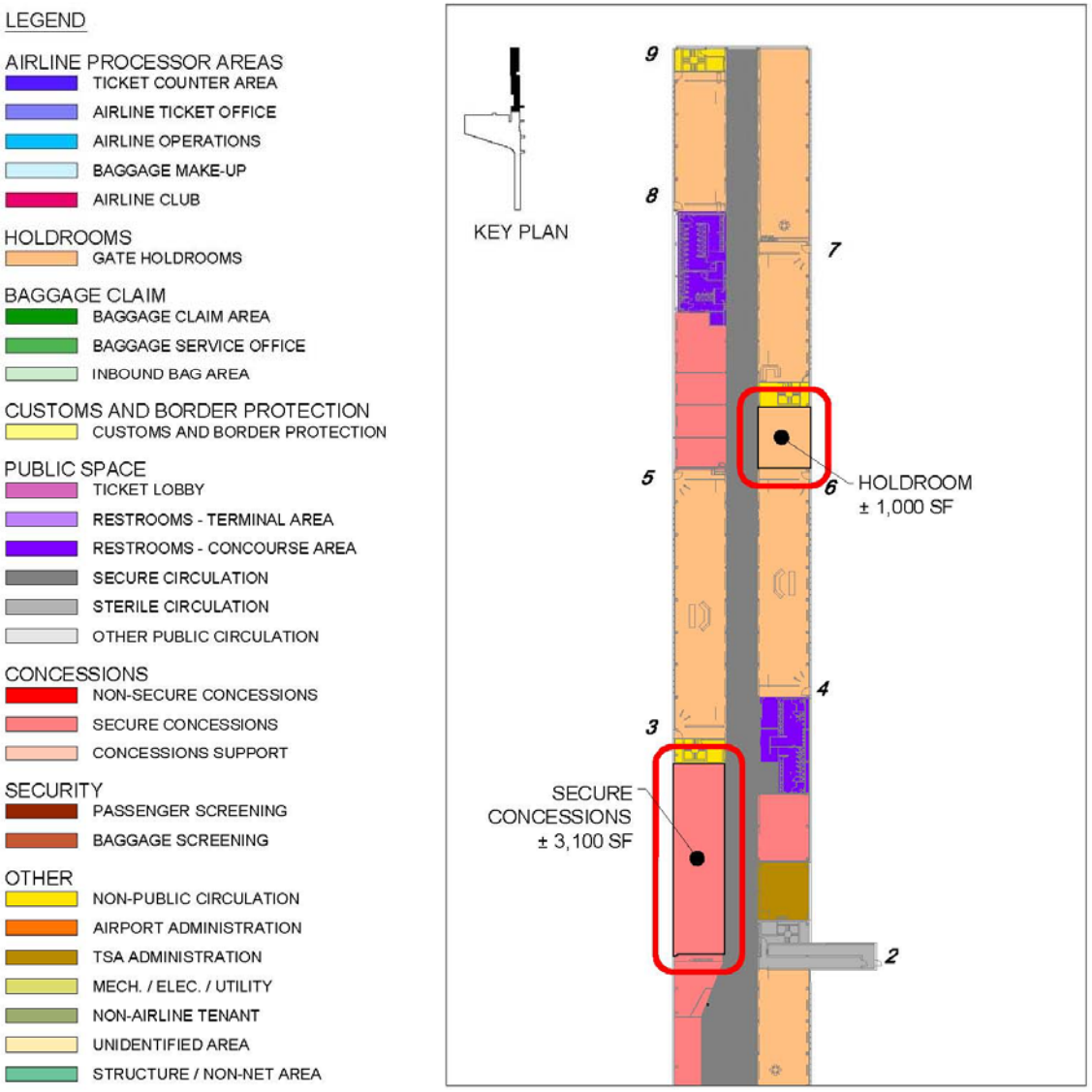


Figure 5-17: Terminal A Departures Level Improvements – Mid Concourse

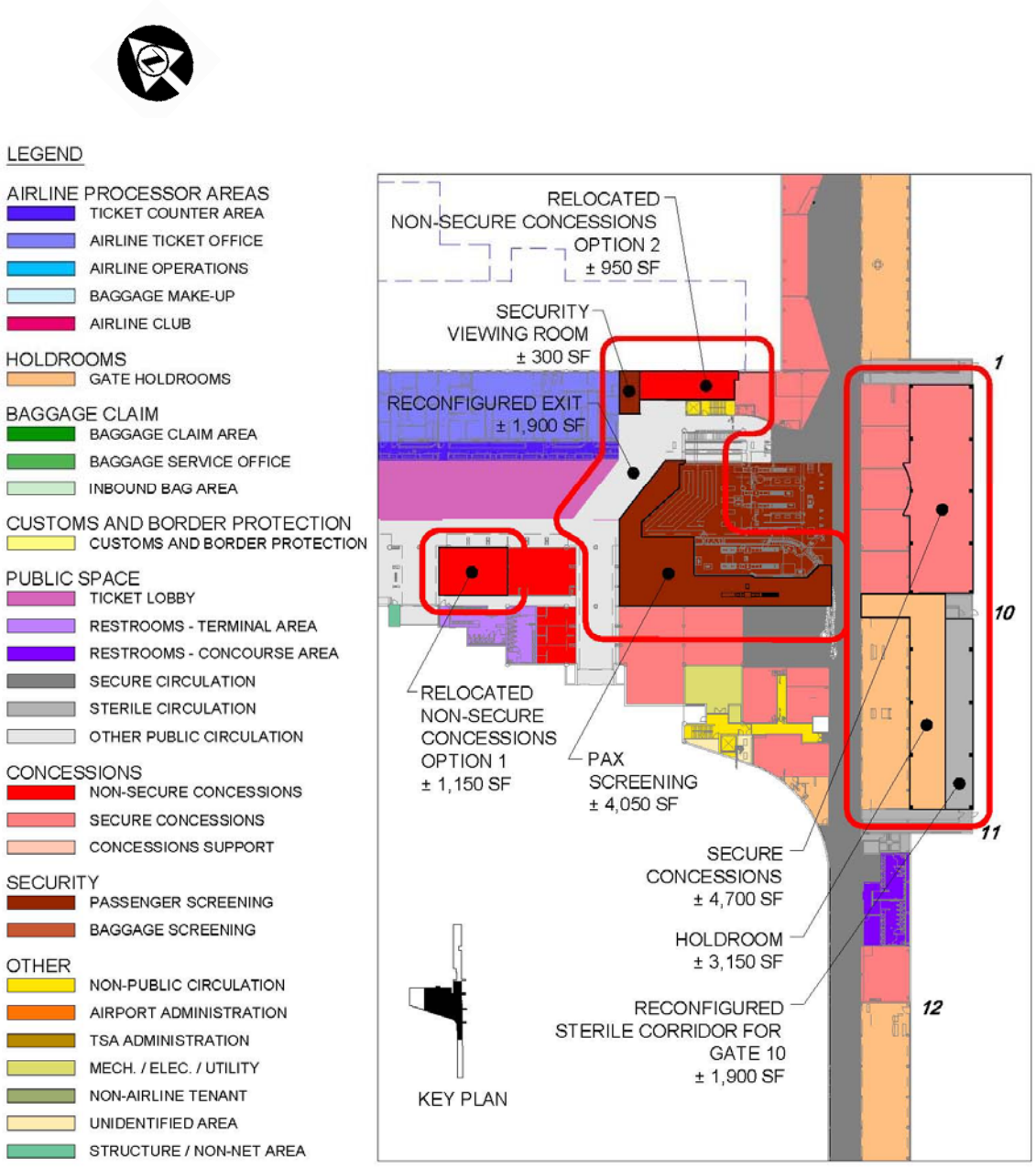
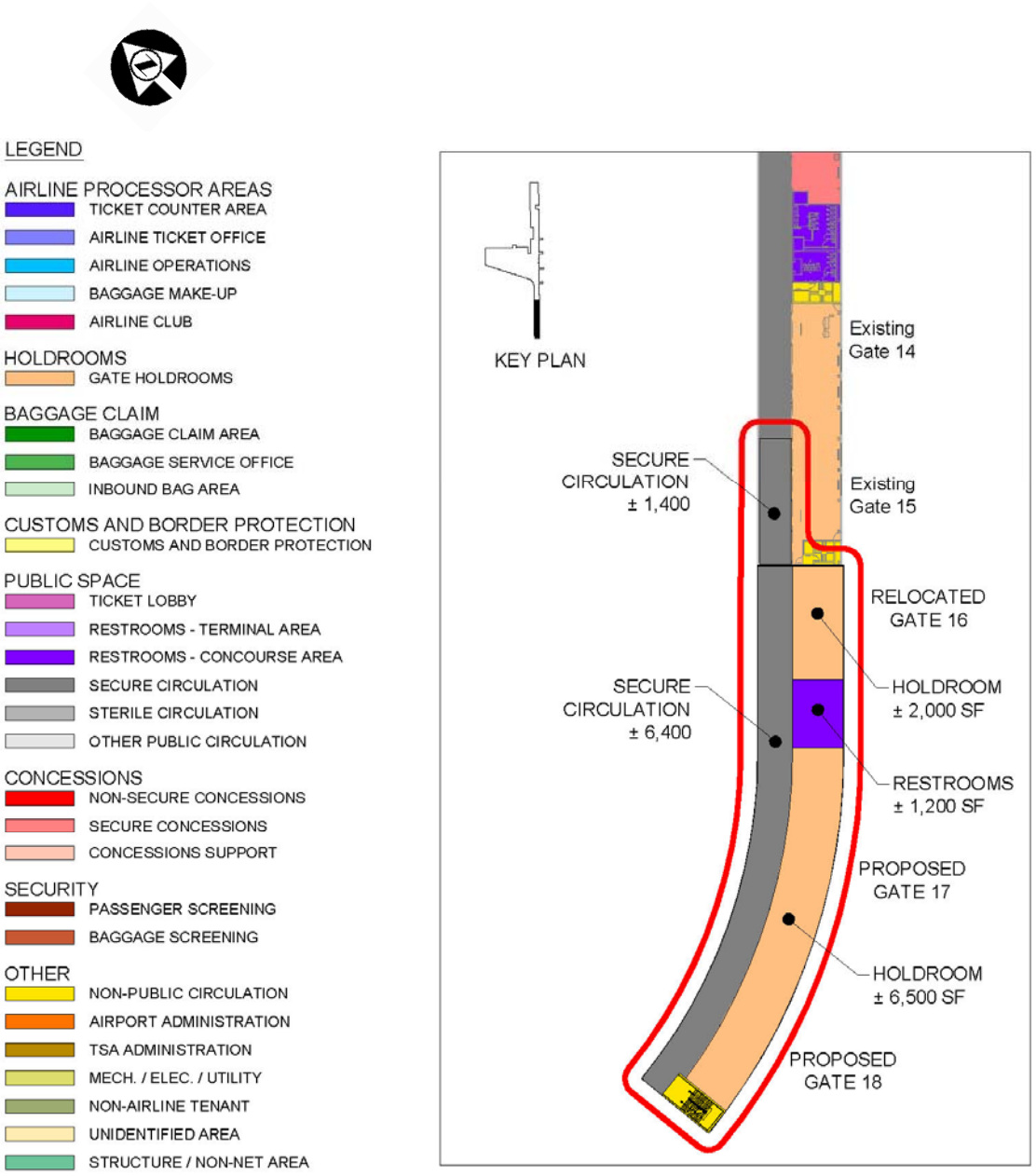


Figure 5-18: Terminal A Departures Level Improvements – South Concourse



Arrivals Level Improvements

As identified in Chapter 4, the Terminal A baggage claim area is severely undersized, and the bag claim device frontage of 684 linear feet is less than the 2010 demand of 834 linear feet. The 2015 bag claim device frontage demand is projected to be 1,126 linear feet. The primary objective of reconfiguring the arrivals level of Terminal A is to increase bag claim device frontage and improve the overall passenger circulation in the currently constrained baggage claim area. Two of the existing domestic claim devices can be expanded toward the curbside. It was also confirmed in Chapter 4 that the existing Customs and Border Protection space could be downsized in the short-term as it is currently oversized. The reduced CBP space could operate at acceptable levels of service until the entire CBP function is relocated to Terminal C. The existing CBP space should be reduced by approximately 3,600 square feet to provide the required space for a fourth domestic baggage claim device and additional baggage claim circulation area, as shown on **Figure 5-20**. This reduction of CBP space may drive the need to remodel the remaining CBP space or expand it into the adjacent ramp area.

Secondary improvements to the arrivals level include infilling six areas along the terminal to accommodate additional airline operations space, consisting of four areas on the north concourse and two areas on the south concourse, as shown on **Figures 5-19** and **5-21,** respectively. Total airline operations space could be increased by approximately 11,000 square feet to accommodate the shortfall in airline operations space. The requirements should be confirmed with the airlines before any development is initiated.

Figure 5-19: Terminal A Arrivals Level Improvements – North Concourse

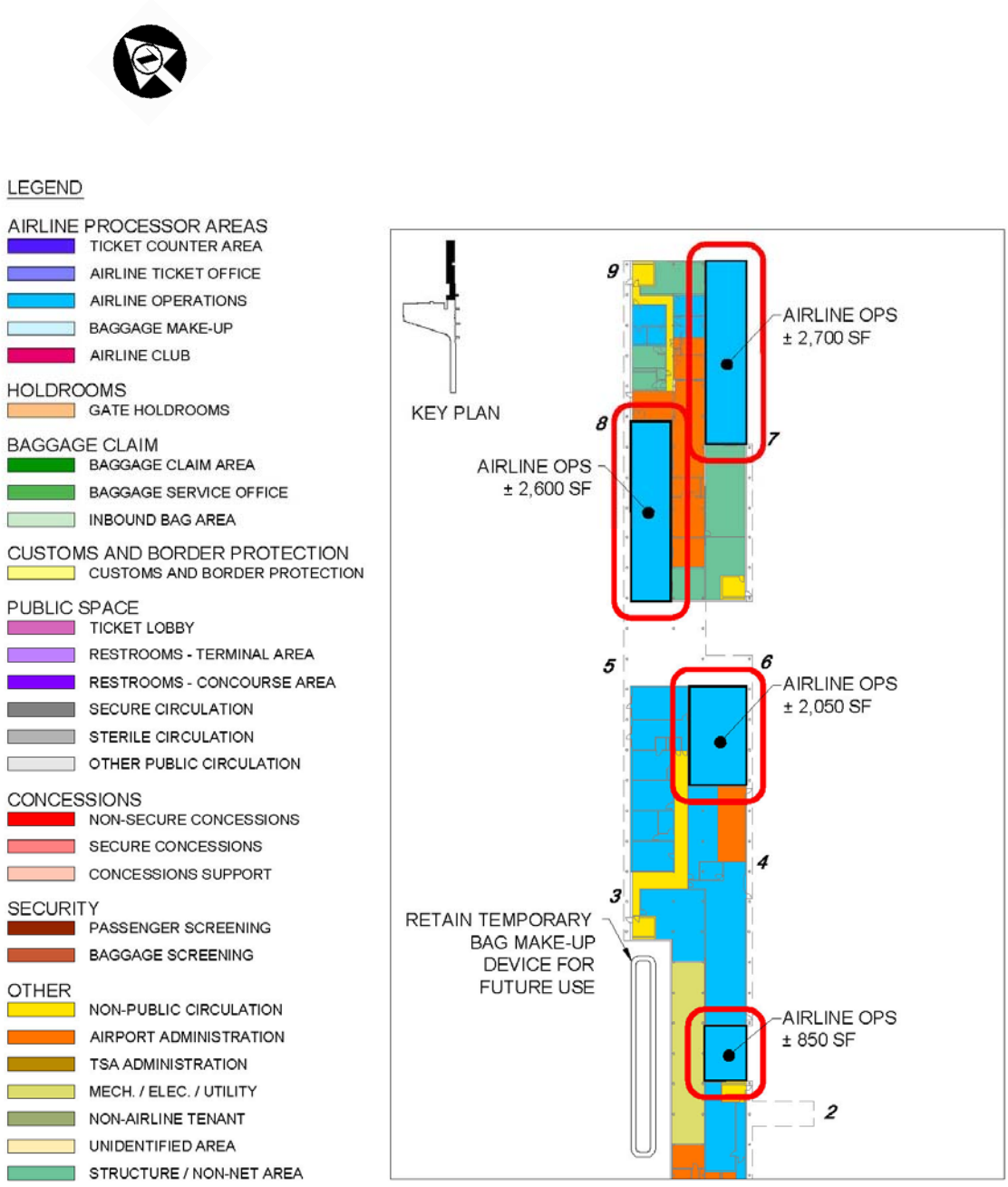


Figure 5-20: Terminal A Arrivals Level Improvements – Mid Concourse

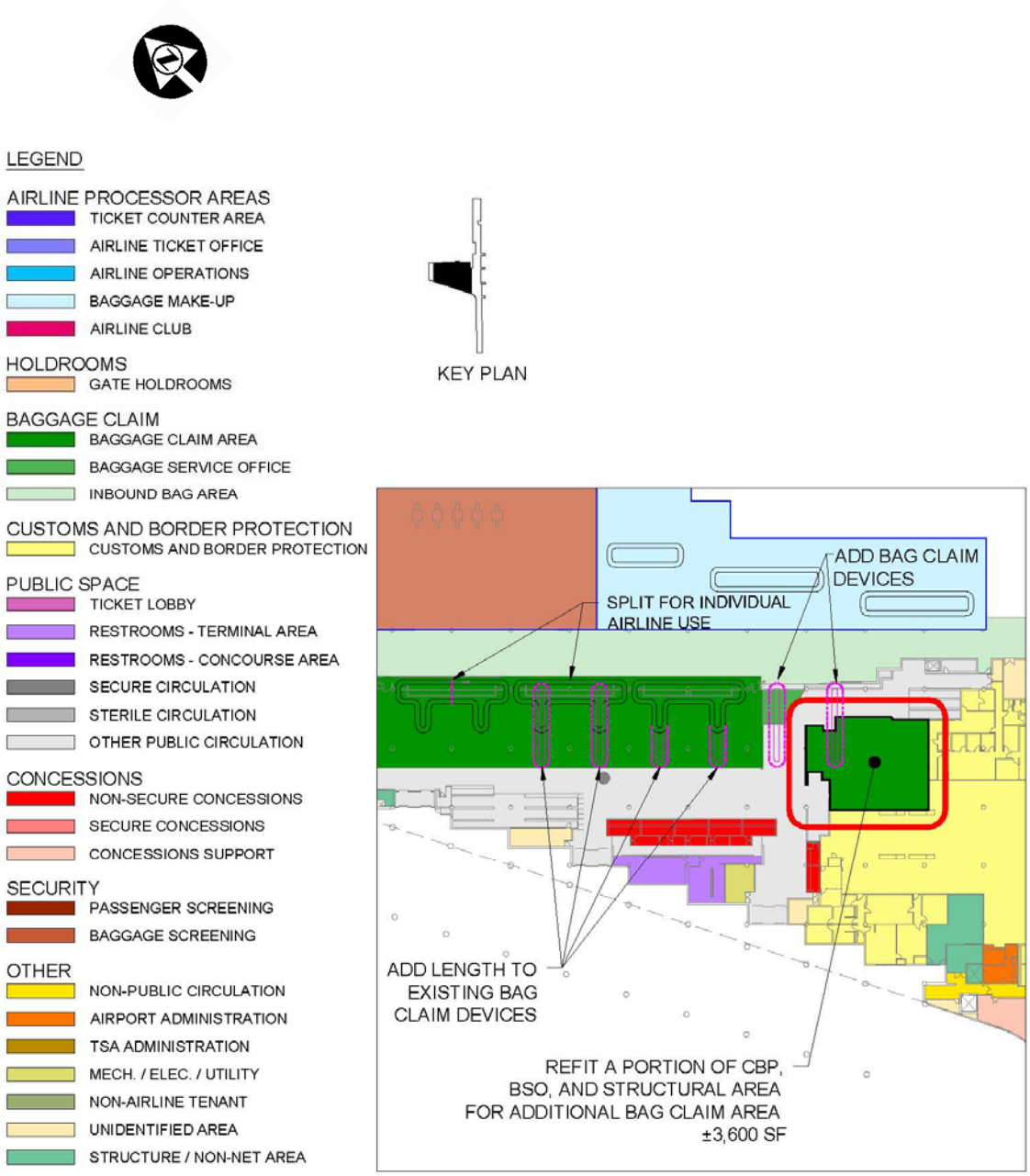
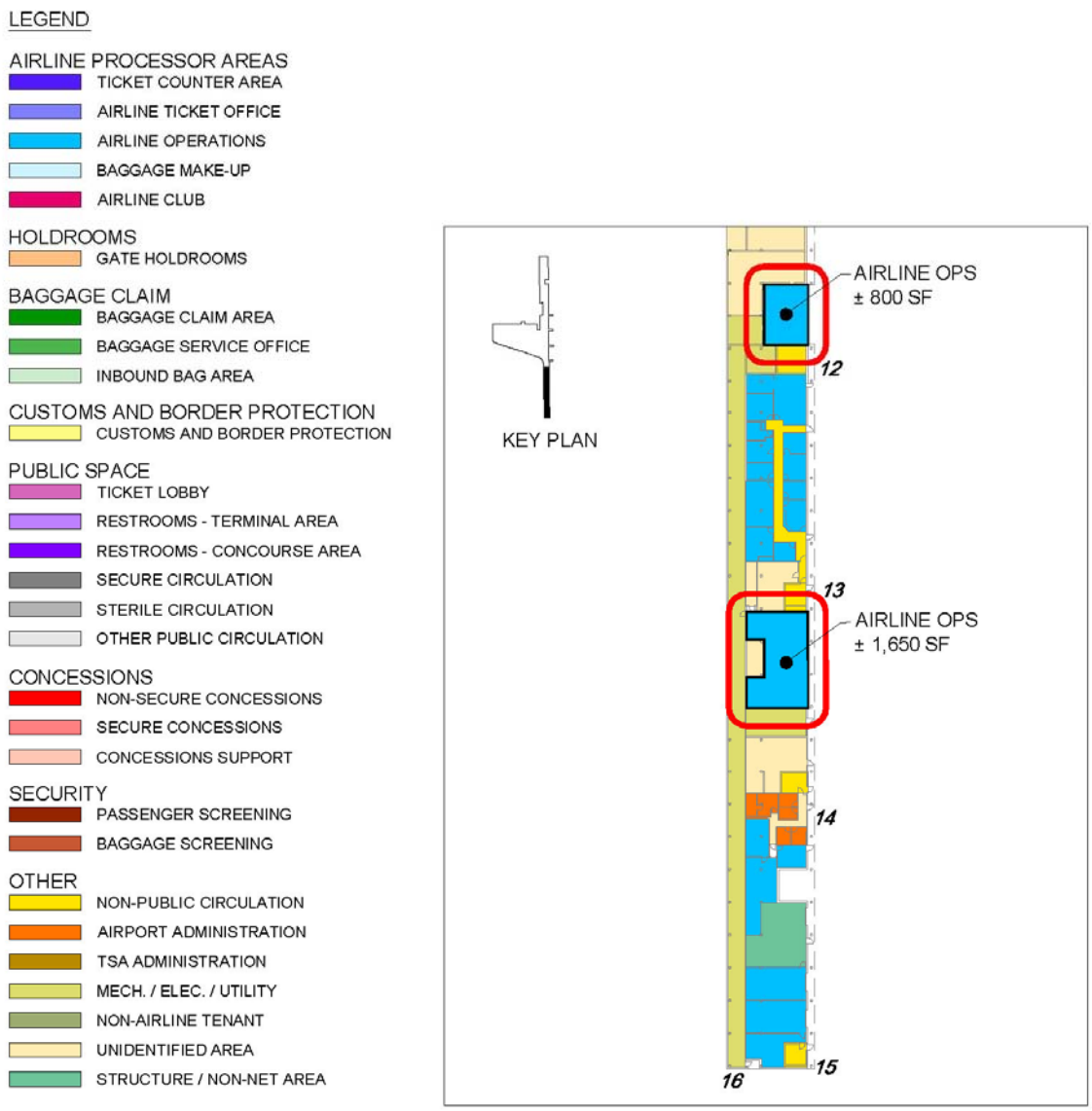


Figure 5-21: Terminal A Arrivals Level Improvements – South Concourse



Terminal A Widening Alternatives

As discussed in the Chapter 4, some functional areas of Terminal A are undersized and can be expanded to better accommodate demand. Four alternatives, as shown on **Figures 5-22** through **5-25**, for widening Terminal A were developed to allow the City to increase holdroom, concession, and operations space on the departures level. The alternatives would increase the width of the concourse from 76 feet to approximately 100 feet or wider if a 30-foot expansion is constructed. Alternative 1 consists of a 20-foot expansion along the entire length of the east side of Terminal A. Alternative 2 expands on Alternative 1 by providing a 20-foot expansion along the entire length of Terminal A, as well as an additional 10-foot expansion along the north concourse, near Gates 1, 2, 4, 6, and 7. Alternative 3 consists of a 30-foot expansion along the east side of the entire terminal. Alternative 4 consists of a 30-foot expansion on the west side of the north concourse, as well as a 20-foot expansion on the east side of the south concourse.

The preferred alternative, Alternative 2, would allow the City to upgrade Terminal A to current industry standards and provide the opportunity to add the necessary space for holdrooms, concessions, and airline operations on the departures level. Additionally, Alternative 2 allows for future expansion if required.

Figure 5-22: Terminal A Widening - Alternative 1

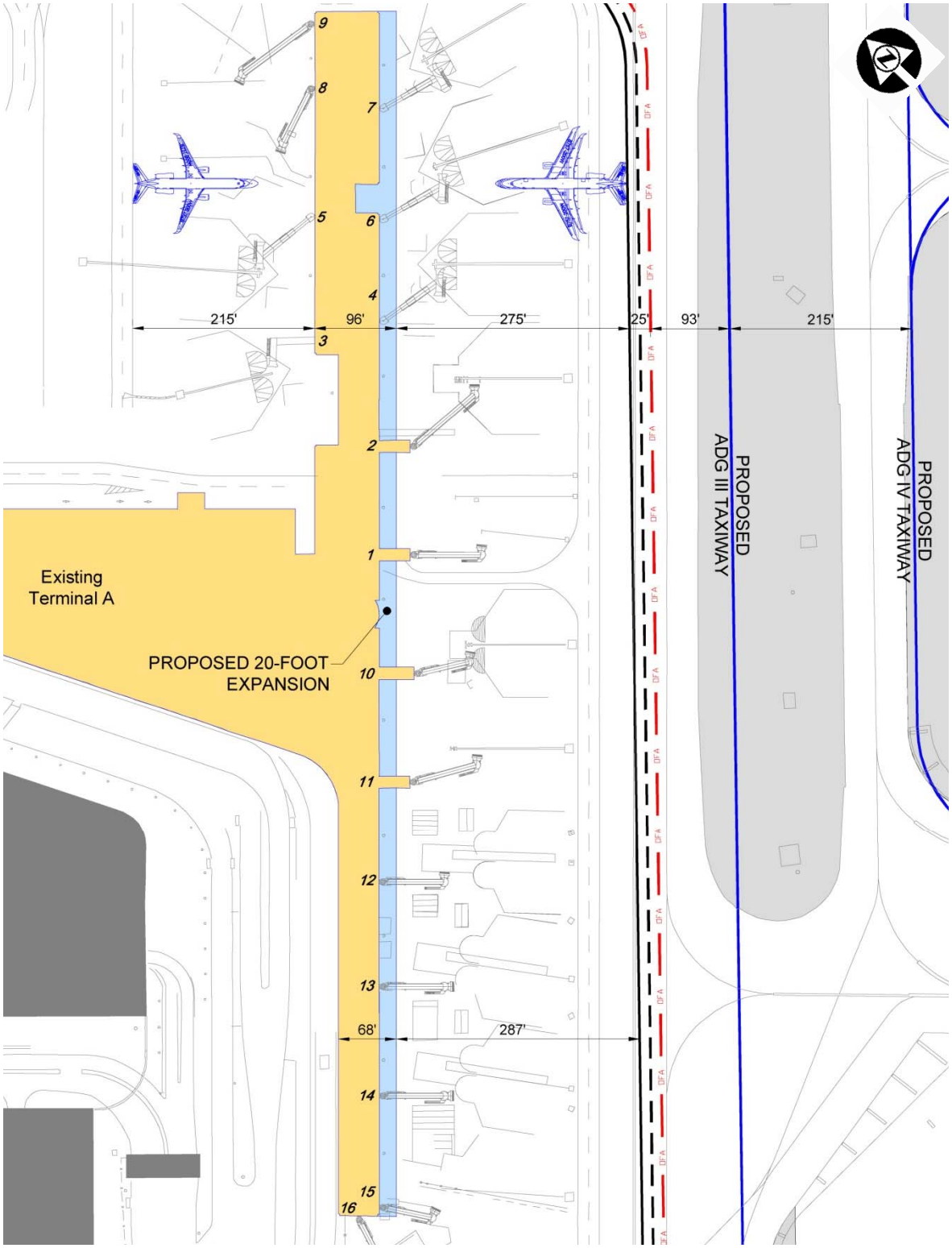


Figure 5-23: Terminal A Widening - Alternative 2

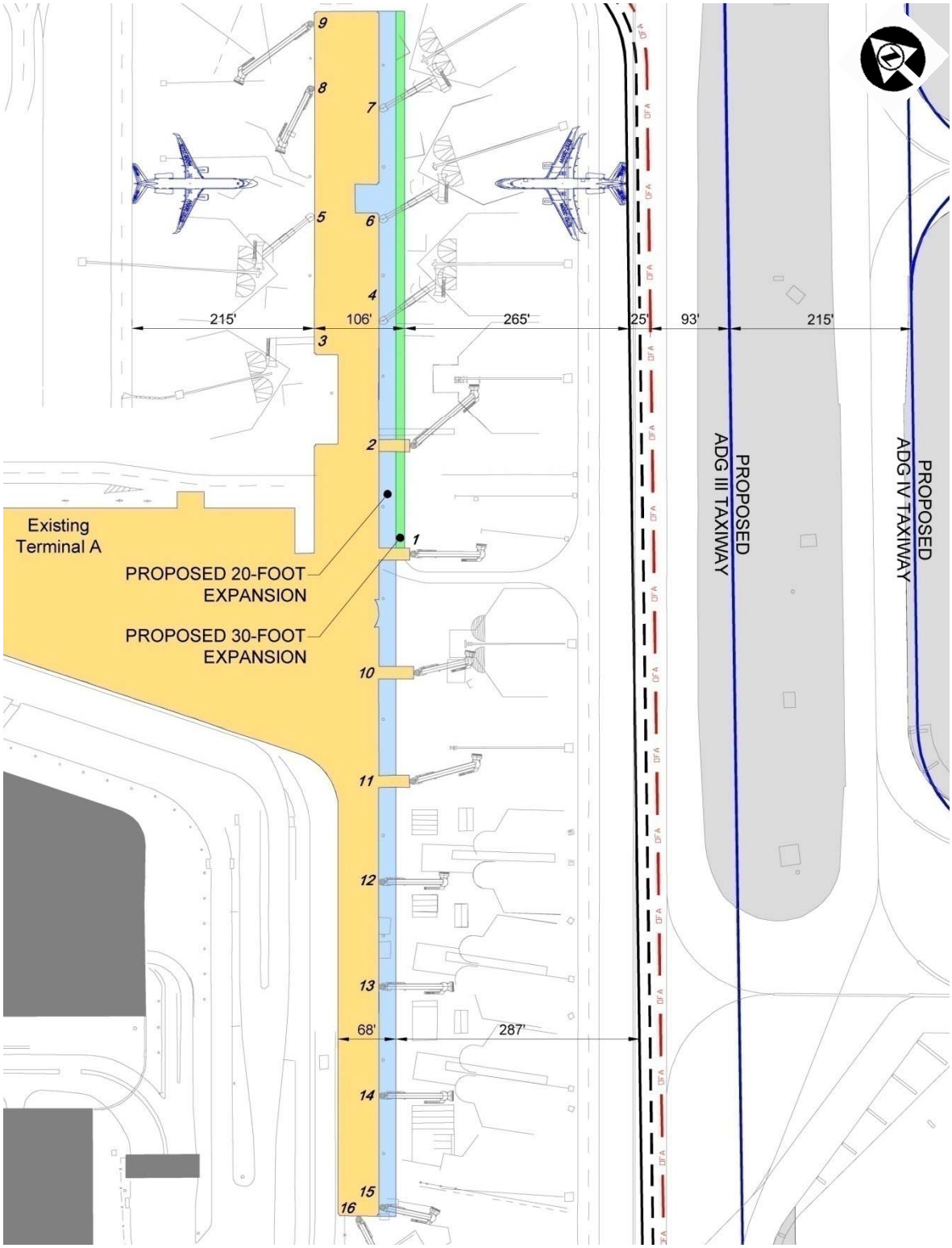


Figure 5-24: Terminal A Widening - Alternative 3

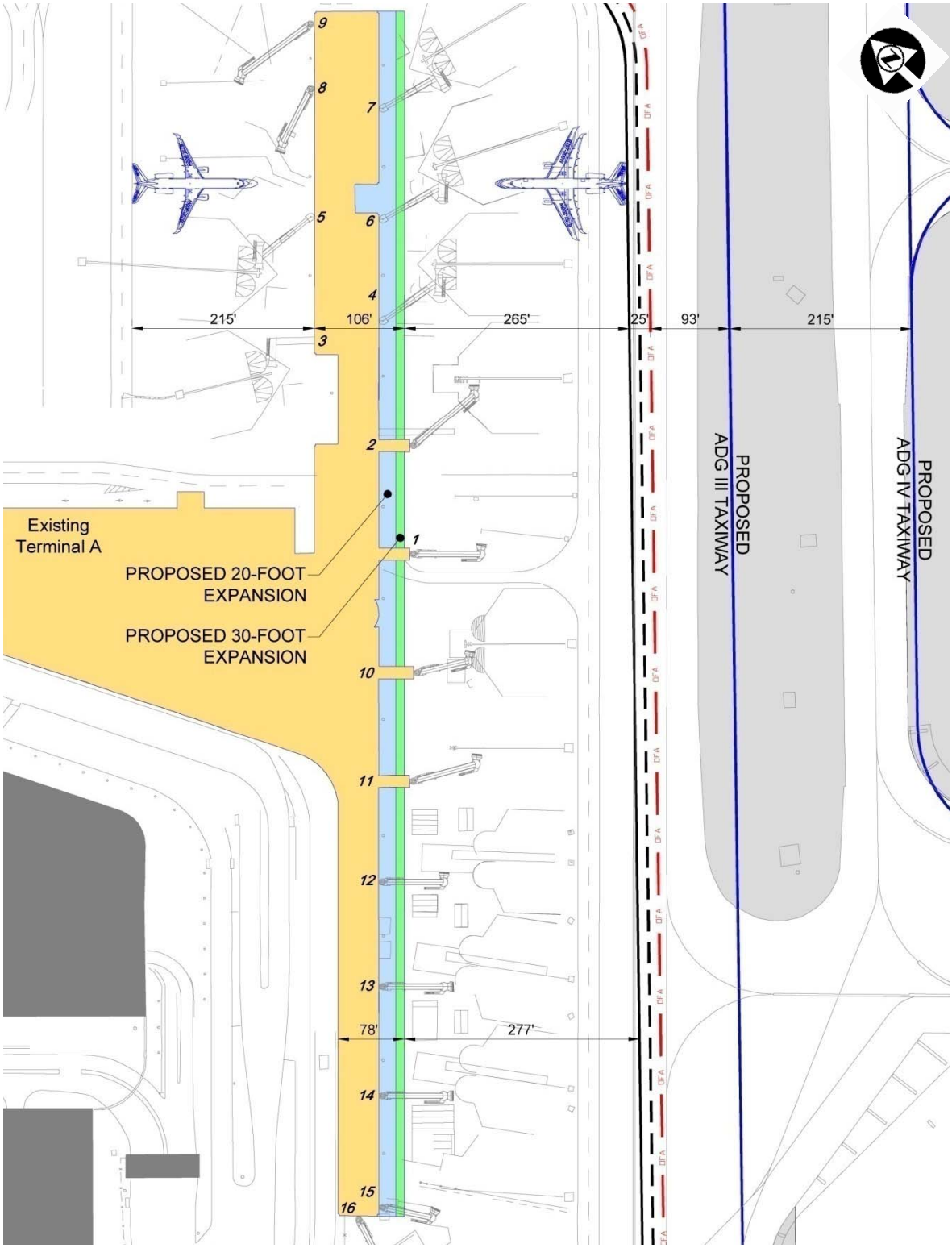
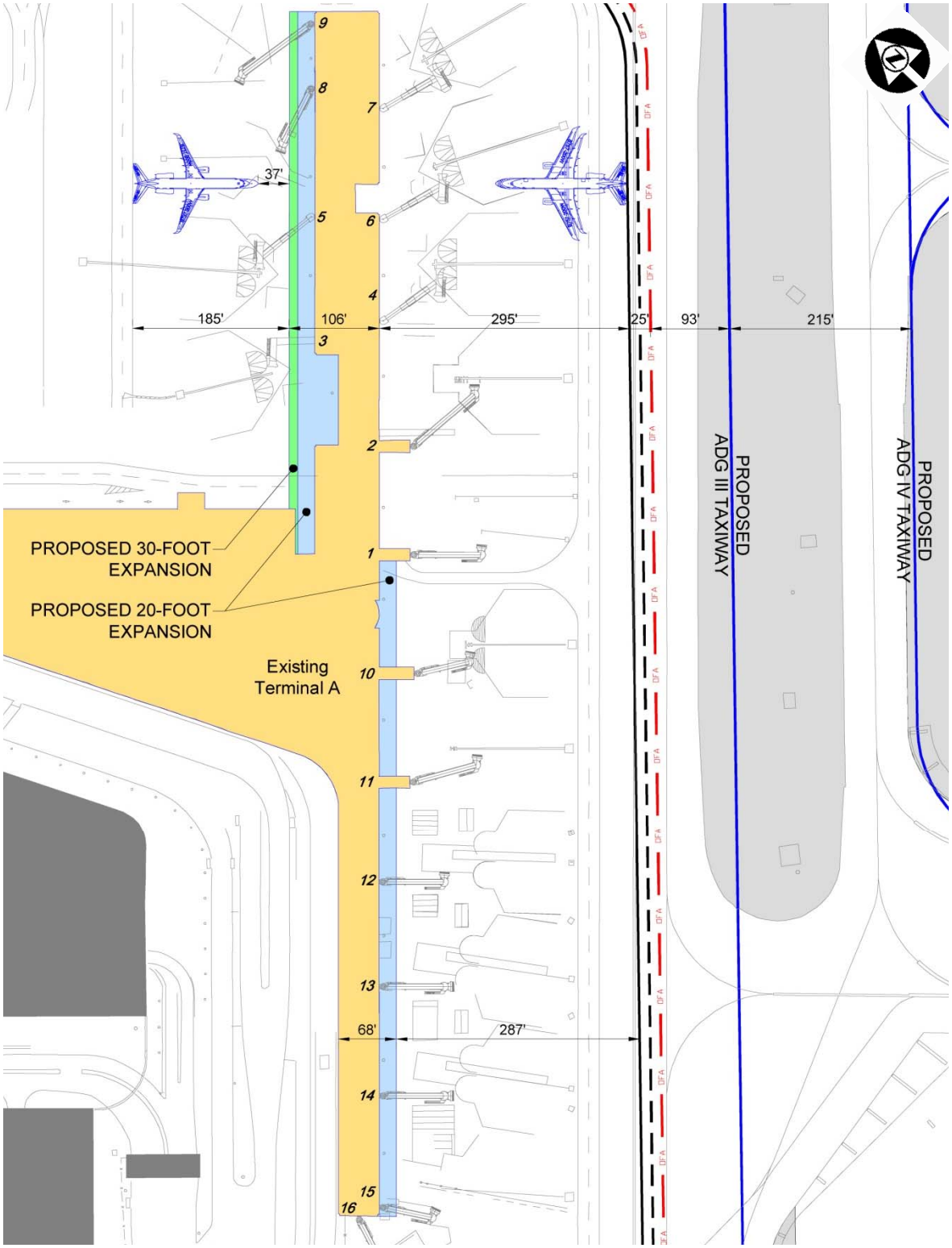


Figure 5-25: Terminal A Widening - Alternative 4



Proposed Terminal A Gates 17 and 18

Two additional gates on Terminal A would provide gate capacity that would delay the requirement for construction of new Terminal C. Two gates could be accommodated on the south end of the south concourse by extending the terminal approximately 330 feet. Doing so would require relocating the Gate 16 passenger boarding bridge from the end of the existing south concourse onto the proposed concourse expansion. Furthermore, the existing AOA access gate would be relocated further west along the south RON aircraft apron. The new expansion would also require an independent heating, ventilation, and air conditioning (HVAC) system to support the additional gates, as the existing HVAC system in Terminal A is operating at capacity. The proposed gates and the adjacent taxilane would accommodate ADG IV aircraft. The proposed expansion would also include a small CBP processing area, sterile corridor, and secure restrooms for international GA aircraft. It should be noted, however, that the location of the small CBP processing area is dependent upon the timing of the redevelopment of the existing Security Airpark to be used for GA operations, discussed later in Section 5.7. The CBP processing area could be implemented in the immediate term, and be relocated once the gate expansion is completed. The proposed location of the CBP processing area in the existing and proposed Terminal A configuration is shown on **Figure 5-26**.

Figure 5-27 demonstrates the potential of further expanding Terminal A along the existing south RON apron. This potential expansion would support four additional ADG III gates in addition to the 17th and 18th gates shown on Figure 5-26. The potential increased gate capacity could further prolong the need for new terminal construction (Terminal C and/or Terminal D). However, the existing passenger processing functions, especially the baggage claim area, cannot support the passenger load that these four additional gates would generate without significant improvement. Additionally, passenger walking distances to reach these gates would be quite long. The full-build in this potential expansion would also require removing/relocating the existing aircraft waste facility/triturator, Silver Ventures aircraft hangar, and vacant administrative buildings.

Figure 5-26: Terminal A - Proposed 17th and 18th Gates

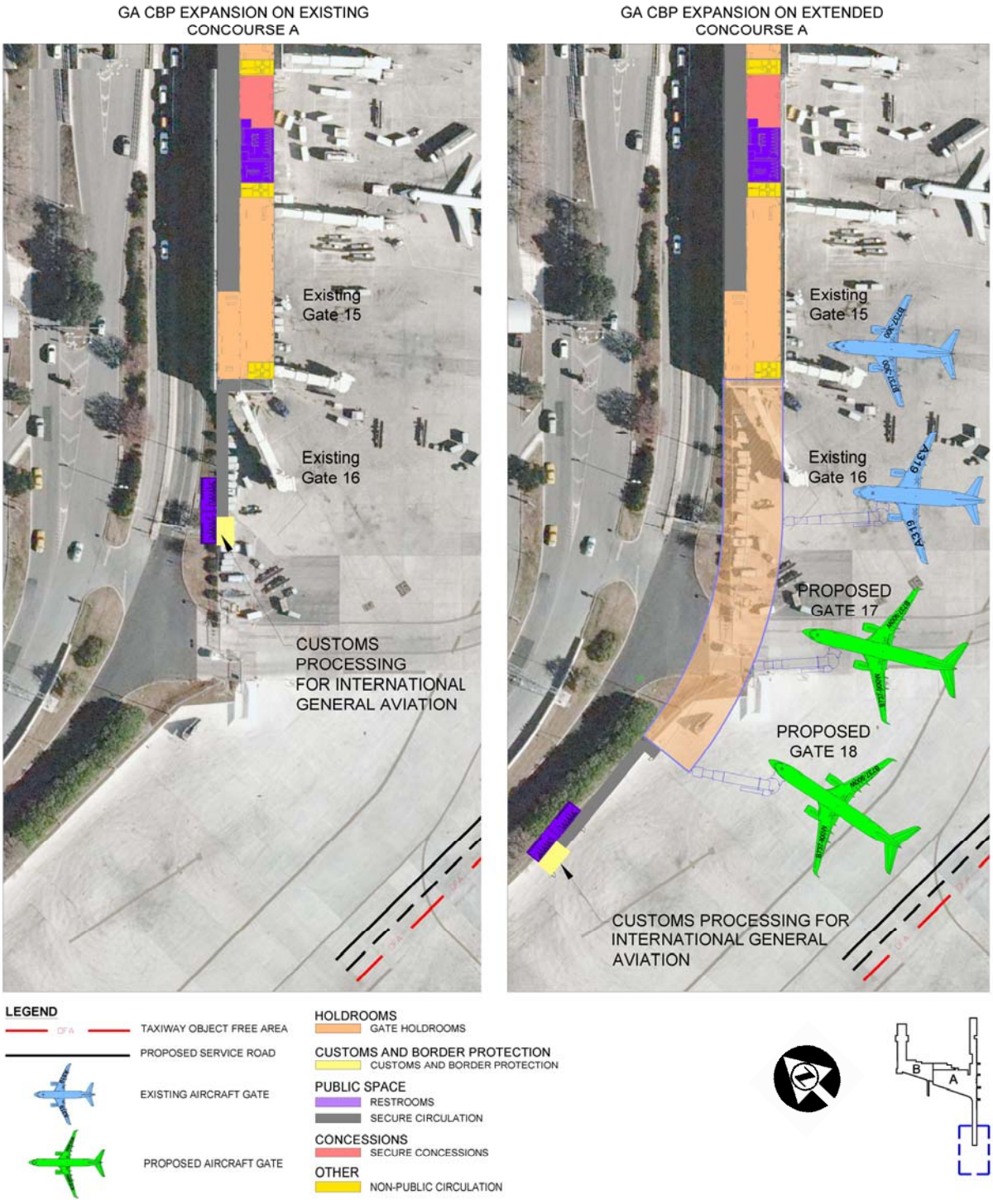


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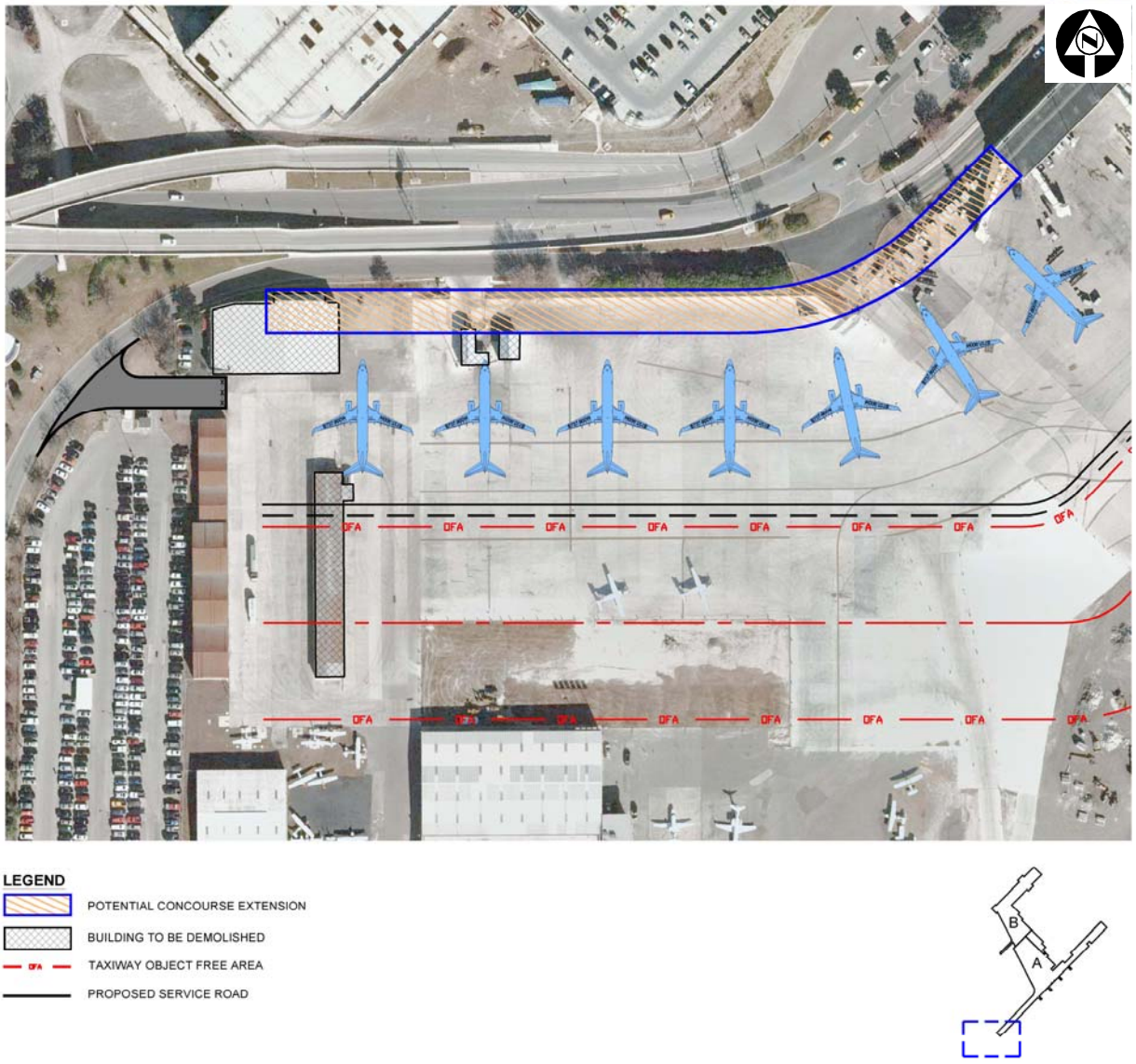
Figure 5-27: Terminal A – Potential Terminal Expansion onto South RON Apron



5.4.2 Long-term Terminal Development

The long-term terminal development analysis focused primarily on determining how (or if) the existing terminal site and terminal facilities would accommodate long-term gate demand through the 2030 (Master Plan) and 2050 (beyond Master Plan) planning periods. It was determined in the analysis that significant terminal development would be required to accommodate long-term demand through both planning periods. As a result, long-term terminal development projects (Terminals C and D) are recommended to ensure that gate capacity can be incrementally increased as demand materializes.

The long-term terminal development analysis was accomplished in three primary steps: (1) determine if the current terminal site is the optimal location compared to alternative sites; (2) examine the feasibility of the long-term passenger processing area, which includes ticketing and security screening functions, and the potential for satellite (or remote) concourse alternatives; and (3) develop and analyze the terminal development alternatives within the selected terminal site.

The forecast 2030 RON aircraft demand was also analyzed, as described in Section 5.4.4.

Terminal Site Selection

During the terminal site selection process, five potential sites in and around Airport property were analyzed to determine the optimal site for terminal development. Each site was individually evaluated by applying the criteria previously discussed. Each site alternative was rated based upon those criteria and evaluation components. The five potential terminal sites are shown on **Figure 5-28**.

Terminal Site 1

This site consists of the existing terminal area as proposed in the 1998 Master Plan Study done by Ricondo & Associates. The primary advantages of this site are: it is consistent with the 1998 Master Plan Study, the existing infrastructure could be used, it is cost effective, and it would minimize impacts to adjacent airfield operations. The disadvantages of Terminal Site 1 are that it would be somewhat less flexible for future expansion and it would have relatively inefficient access to Runway 12L-30R.

Terminal Site 2

The northwest terminal site would require redeveloping the existing west complex facilities and acquiring several off-Airport properties along U.S. 281. The primary advantages of Terminal Site 2 are that it would provide future expansion flexibility, ease of construction and phasing, and favorable access to Runway 12R-30L. The disadvantages of this site are that the first gate would be very costly, it does not have adequate landside access, it would require off-Airport property acquisition and the relocation of existing Airport facilities, and it would have relatively inefficient access to Runway 12L-30R.

Figure 5-28: Potential Terminal Sites

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Terminal Site 3

The southeast terminal site is located outside of the existing Airport property line and would require extensive off-Airport property acquisition along Wetmore Road. The advantages of this site are that it would provide ease of construction and phasing and optimum access to the existing railroad right-of-way. The primary disadvantages of Terminal Site 3 are that the first gate would be very costly, it would not provide adequate land access, it would require off-Airport property acquisition, it is located near residential neighborhoods, and it would be limited by airfield and airspace constraints.

Terminal Site 4

Under the east midfield terminal concept, the existing north complex facilities would be redeveloped and would function best with the addition of a new widely spaced Runway 12L-30R. The primary advantages of Terminal Site 4 are that it would provide future expansion flexibility and ease of construction and phasing, and it would function best with an additional parallel runway (Runway 12L-30R). The main disadvantages of this site are that the first gate would be very costly and it would affect a floodplain and an active solid waste facility.

Terminal Site 5

The west midfield terminal concept is similar to the east midfield terminal concept described above; however, Terminal Site is off-Airport, which would require additional property acquisition. The key advantages of Terminal Site 5 are that it would provide future expansion flexibility and ease of construction and phasing, it would be operationally efficient, and it would function best with an additional parallel runway (Runway 12L-30R). The primary disadvantages of this site are that the first gate would be very costly, it would affect a floodplain and an active solid waste facility, and it would require off-Airport property acquisition.

Terminal Site Evaluation

The terminal site evaluation process demonstrated that the existing terminal site (Terminal Site 1) would provide the most feasible alternative for future terminal expansion. Terminal Site 1 received the highest ratings and would be the most cost effective. These advantages are highlighted in **Table 5-3,** which depicts Terminal Site 1 as the alternative with the most positive ratings and no negative ratings. Each of the other alternatives received a combination of all three ratings.

Table 5-3: Evaluation of Terminal Site Alternatives

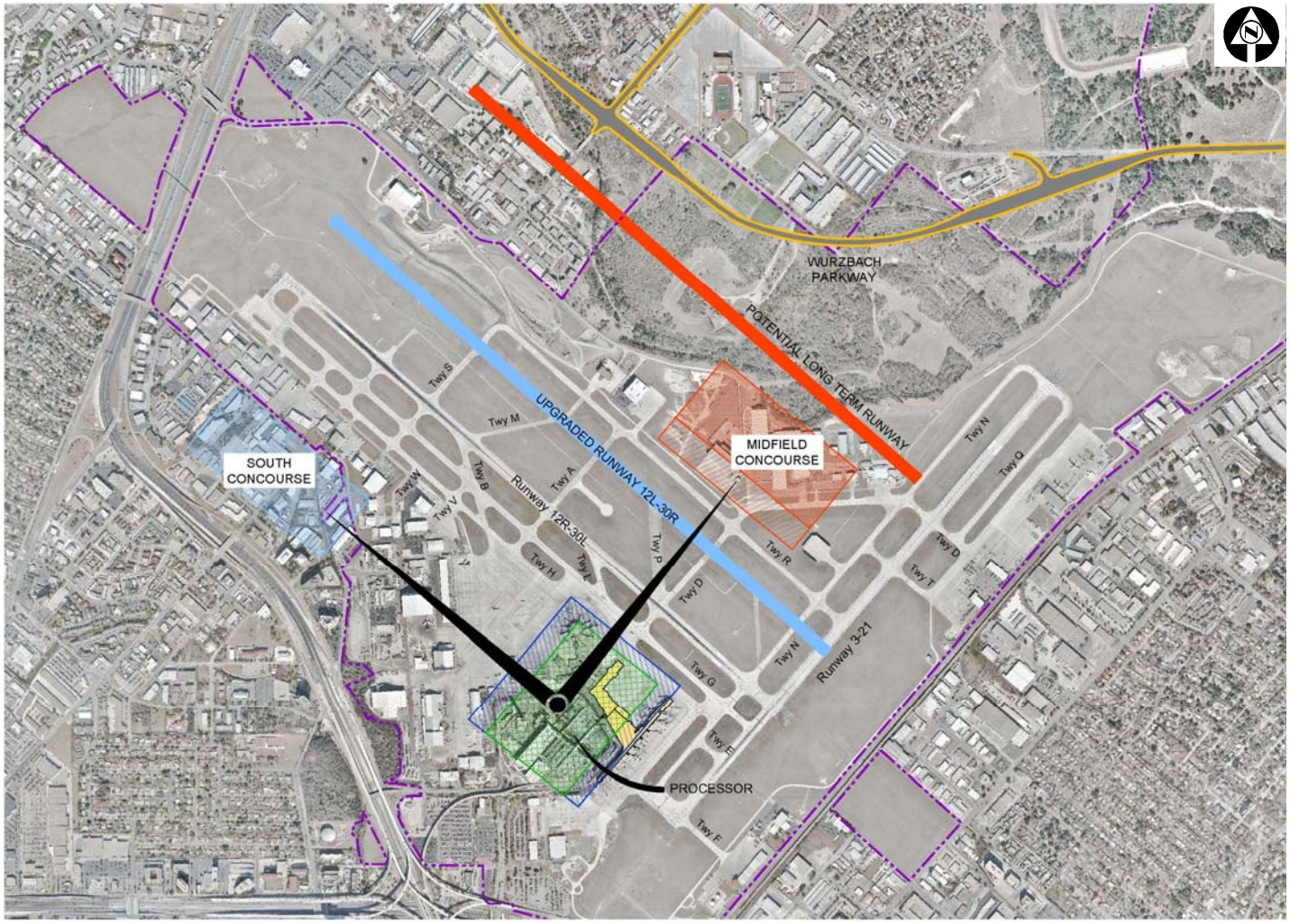
	Terminal Sites				
	1	2	3	4	5
Regional Socioeconomic Benefits					
Meets 2030 capacity needs	●	●	●	●	●
Allows long term growth of terminal / airfield	○	○	◐	●	●
Meets runway length requirements	-	-	-	-	-
Optimizes nonterminal land development	○	○	○	○	○
Provides opportunity to serve as a regional "gateway"	-	-	-	-	-
Supports a regional rail system	●	○	●	○	○
Financial Feasibility					
Capital investment requirement	●	○	◐	◐	◐
Ability to develop incrementally	●	◐	◐	◐	◐
Opportunities for nonairline revenue	-	-	-	-	-
Requirement for land acquisition	●	◐	◐	○	◐
Operational Efficiency					
Airfield configuration optimizes aircraft movement	●	●	●	●	●
Promotes airline staff efficiency	-	-	-	-	-
Roadways, curbside, parking meet capacity needs	●	○	◐	●	●
Ease of maintenance	-	-	-	-	-
Flexibility of facility for multiple users	-	-	-	-	-
Minimizes impact of construction phasing	○	●	●	●	●
Customer Service					
Minimizes walking distances / vertical movements	-	-	-	-	-
Sufficient space for passenger processing	-	-	-	-	-
Allows for intuitive wayfinding	-	-	-	-	-
Access to rental car facilities	-	-	-	-	-
Environmental					
Lifecycle resource use	-	-	-	-	-
Reuse of existing facilities	●	◐	◐	◐	◐
Impact on local community	●	●	◐	◐	◐
Preservation of open space	●	○	○	◐	◐

● Meets criterion
○ Neutral
◐ Does not meet criterion

Potential Long-term Airline Processor Areas

The analysis also demonstrated the potential for long-term expansion beyond the projected 2050 requirements, when the site's terminal capacity might be reached. The current terminal area would serve as an airline processor supporting remote concourses reached via automated people mover. A satellite concourse could be constructed via one of two scenarios: (1) a midfield satellite concourse or (2) a south satellite concourse. **Figure 5-29** depicts the midfield satellite concourse and associated airfield expansion and the south satellite concourse and its associated runway extension. Both scenarios require off-Airport property acquisition, and environmental mitigation. Additionally, the existing processor area could be accessed via an intermodal facility with connection to the existing rail line on the south side of the Airport. This analysis is mostly qualitative, as it would occur beyond the 20-year planning horizon of the Master Plan, as well as the 40-year long-term planning horizon. The analysis was conducted simply to demonstrate the long-term runway and gate capabilities of the Airport beyond the 2050 (long-term) planning horizon.

Figure 5-29: Potential Long-term Airline Processor and Satellite Concourse Expansion



Terminal Development Alternatives

The third component of the long-term terminal development process was an evaluation of nine terminal development alternatives in the existing terminal envelope to determine the optimal terminal configuration. The primary focus of the evaluation was whether or not the alternative would accommodate 2030 gate demand; however, to determine the full potential of the site, the feasibility of accommodating 2050 gate demand was also evaluated. The nine alternatives were subjected to two rounds of screening to determine the preferred terminal alternative. In the first round of screening, four alternatives were eliminated because they were similar to other alternatives; the remaining five alternatives were advanced to a second round of screening to determine the preferred terminal alternative. A detailed description of the criteria and the results of each evaluation follow the summary of each alternative, described below.

It should be noted that each alternative would provide the potential to add a connector rail line from the main terminal area to a proposed ground transportation center located southeast of the existing terminal area, along Wetmore Road. Additionally, the proposed ground transportation center could tie into the existing Union Pacific Railroad, creating a true multimodal facility.

Terminal Alternative 1

Terminal Alternative 1, shown on **Figure 5-30**, is similar to the design included in the 1998 Airport Master Plan, and consists of the development of new Terminals C and D. Terminals B and C would be connected via a narrow (approximately 20-foot wide) walkway. This terminal configuration would extend the Terminal C and D concourse piers perpendicular to the terminal loop road. The notable advantages of Alternative 1 are that it would meet 2030 and 2050 gate demand, incorporate the recently completed design of Terminal C, and not affect existing Airport tenants. The primary disadvantage of this alternative is that the narrow connector between Terminals B and C would limit the ability to create a sense of a contiguous terminal area. Additionally, the single ADG III taxilane between the Terminal C and D piers could create airfield congestion during peak periods.

Terminal Alternative 2

This alternative would also maintain Terminals C and D similar to the design in the 1998 Airport Master Plan; however, under Terminal Alternative 2, the concourse piers would be angled perpendicular to the primary runway, as shown on **Figure 5-31**. The primary advantages of this alternative are that it would meet 2030 and 2050 gate demand, incorporate the current design of Terminal C, and have more efficient airfield movement capability than Terminal Alternative 1. The primary disadvantage of this alternative is that the narrow connector between Terminals B and C would not create the sense of a contiguous terminal area.

Figure 5-30: Terminal Alternative 1

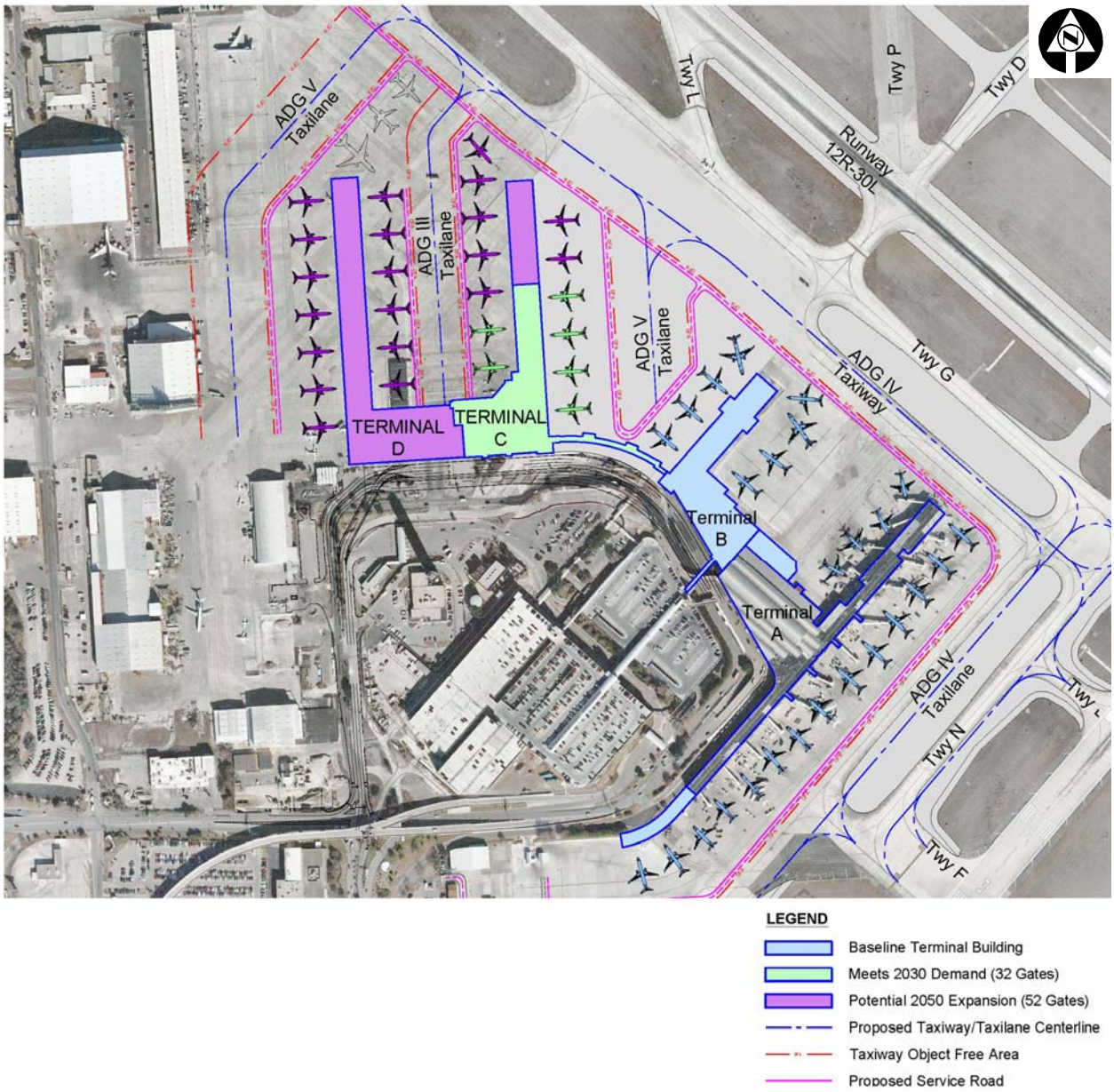
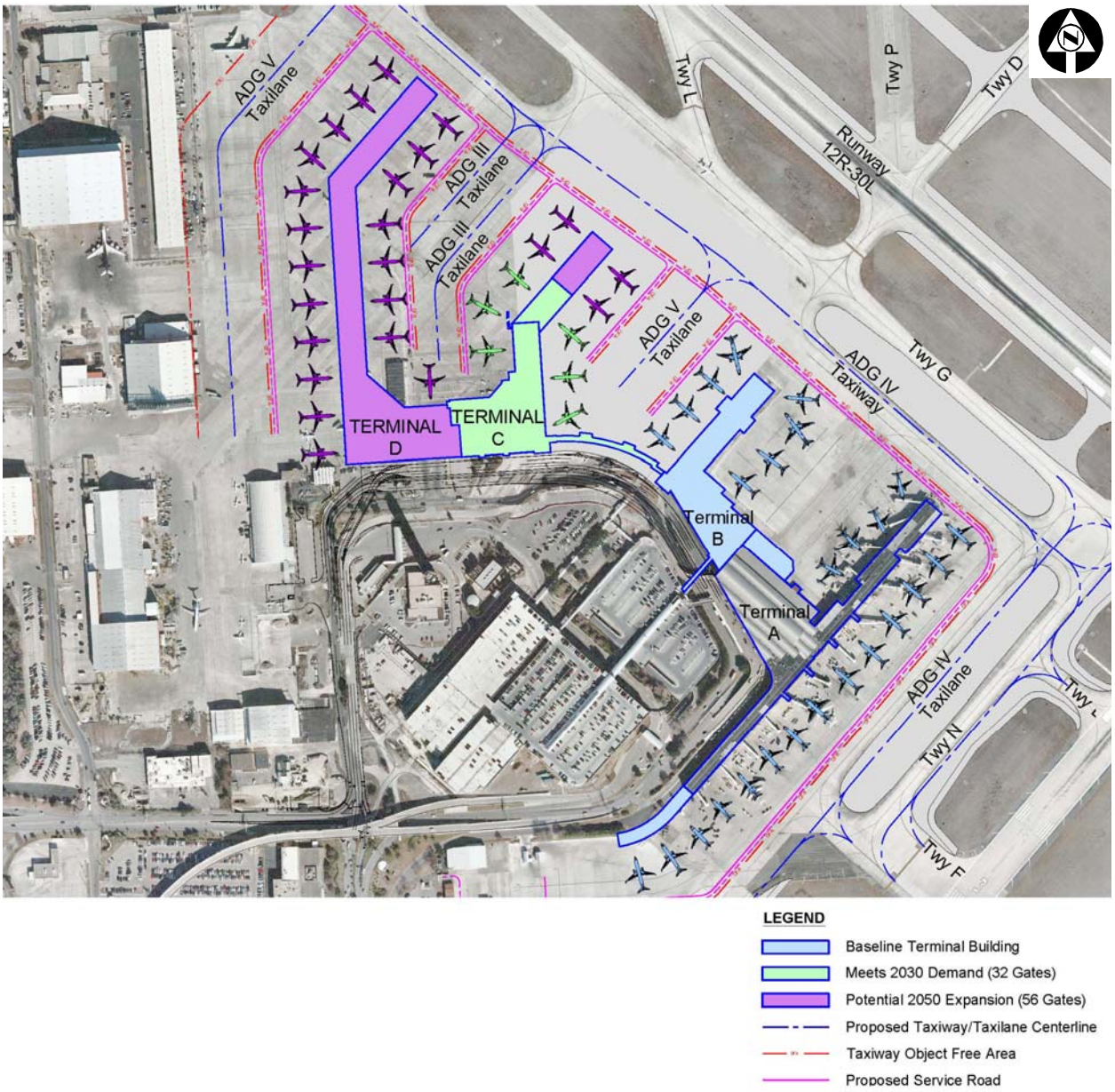


Figure 5-31: Terminal Alternative 2



Terminal Alternative 3

Terminal Alternative 3 is essentially a modification of Terminal Alternative 2, in which the ADG V taxilane between Terminals B and C would be reduced to a B-757-200W- (B752W-) specific taxilane and the apron depth on the west side of Terminal C would be increased, as shown on **Figure 5-32**. The aircraft circulation issues in the alley between Terminals C and D is somewhat alleviated. However, reducing the ADG V taxilane between Terminals B and C would eliminate the dual ADG III taxiing capabilities in that area. The primary advantages of Terminal Alternative 3 are that it would meet 2030 and 2050 gate demand and incorporate the current design of Terminal C. The primary disadvantage of this alternative is that the narrow connector between Terminals B and C would not create a sense of a contiguous terminal area. Additionally, the single B752W-specific taxilane between Terminals B and C could create airfield congestion during peak periods.

Terminal Alternative 4

Terminal Alternative 4 would provide a large primary passenger circulation area within Terminal C, which would be linked to Terminals B and D via 120-foot-wide and 200-foot-wide connectors, respectively, as shown on **Figure 5-33**. The primary advantages of this alternative are that it would meet 2030 and 2050 gate demand and result in a contiguous terminal area. The primary disadvantage of this alternative is that the long single B752W-specific taxilane between Terminals C and D could lead to airline aircraft pushback delays.

Terminal Alternative 5

Terminal Alternative 5 would provide Terminals C and D similar to Terminal Alternative 4; however, under this alternative, each terminal would have its own defined passenger processing area, as shown on **Figure 5-34**. Furthermore, Terminals B and C would be connected via a 50-foot-wide walkway. The primary advantages of this alternative are that it would meet 2030 and 2050 gate demand without affecting adjacent Airport tenants. The primary disadvantage of this alternative is that it the narrow connector between Terminals B and C would not create a sense of a contiguous terminal area. Additionally, the single B752W-specific taxilane between Terminals B and C could create airfield congestion during peak periods.

Terminal Alternative 6

Terminal Alternative 6 would provide frontage gates at Terminal C until the terminal is expanded into Terminal D, as shown on **Figure 5-35**. This alternative also incorporates a satellite concourse, which would be accessed from the main terminal via a below grade connector. The West Air Cargo Terminal and San Antonio Aerospace (SAA) facilities would have to be relocated to provide for construction of the satellite concourse. The primary advantages of this alternative are that it would significantly exceed 2030 and 2050 gate demand and create a sense of a uniform terminal area. The primary disadvantage of this alternative is that the construction costs for the satellite concourse and the below grade connector would be high. Additionally, several Airport tenants would have to be relocated under this alternative.

Figure 5-32: Terminal Alternative 3

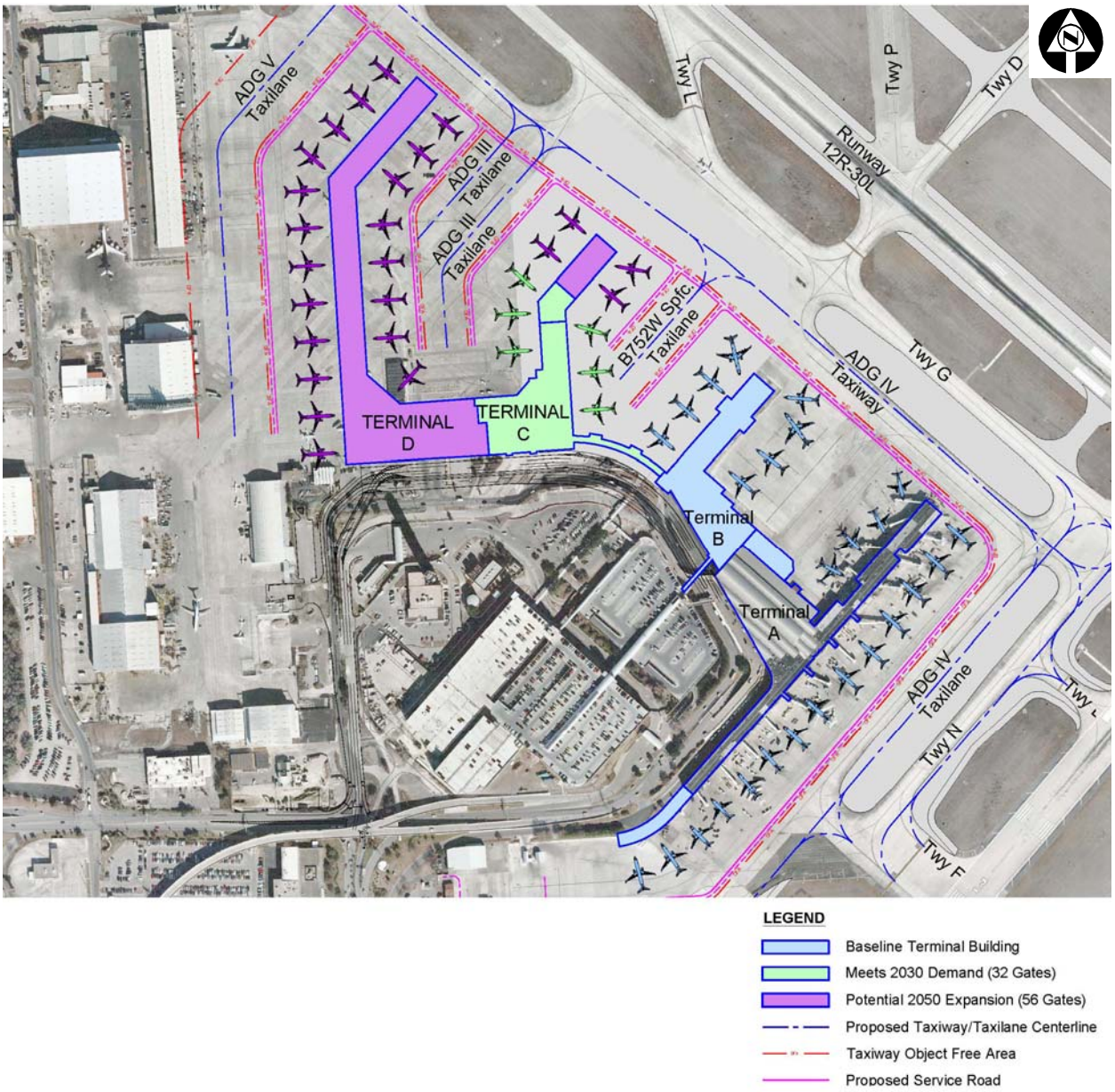


Figure 5-33: Terminal Alternative 4

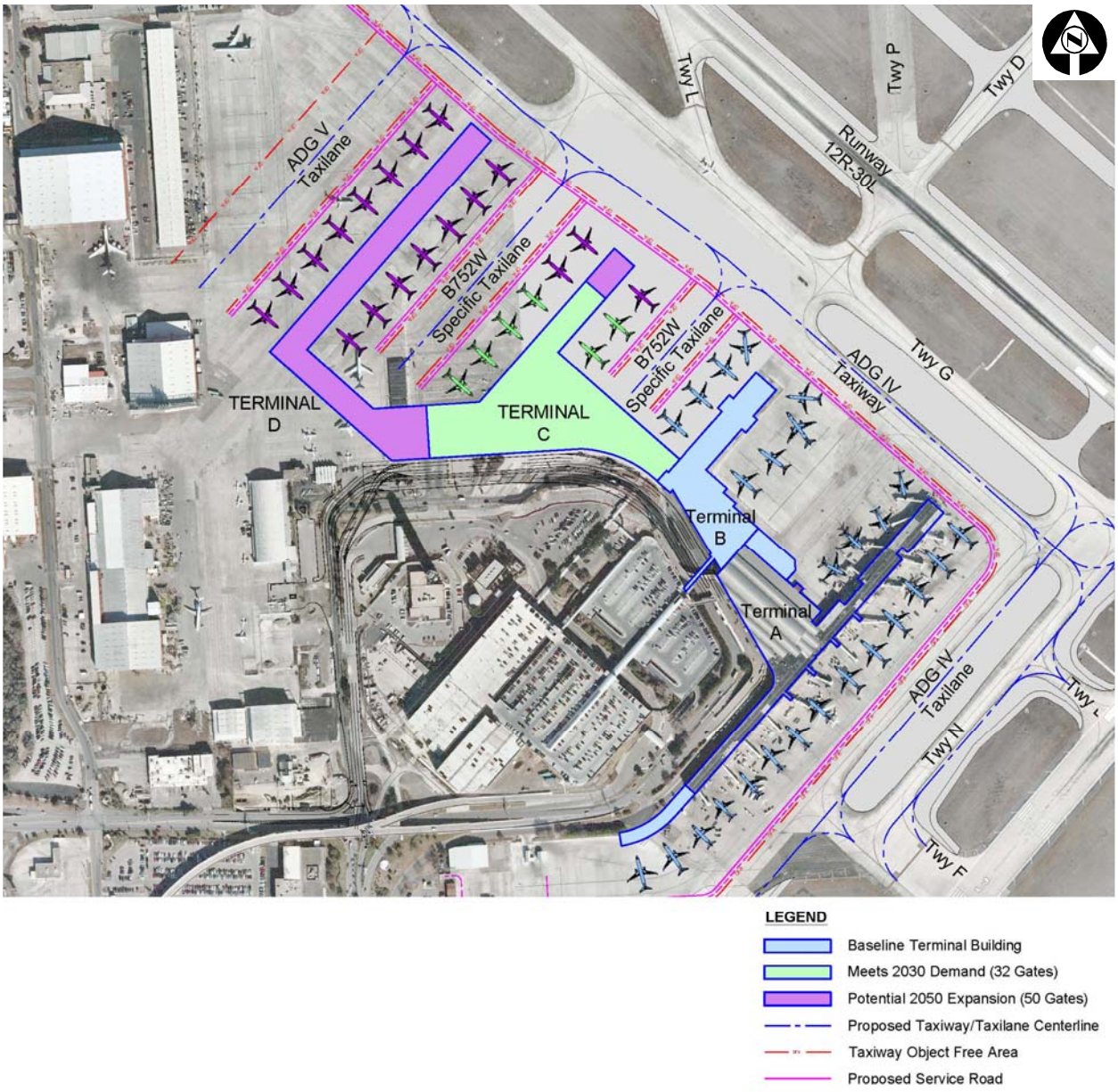


Figure 5-34: Terminal Alternative 5

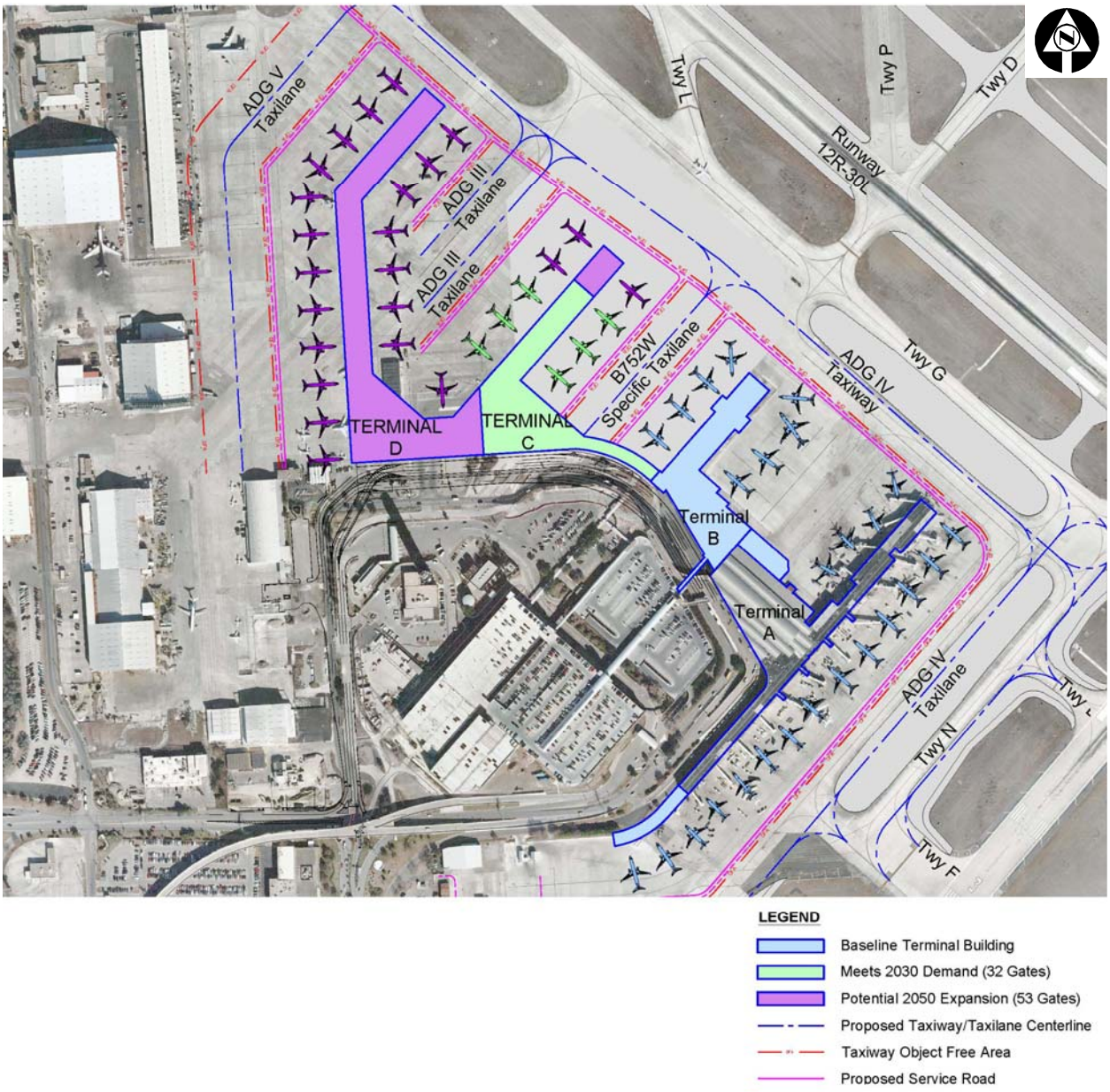
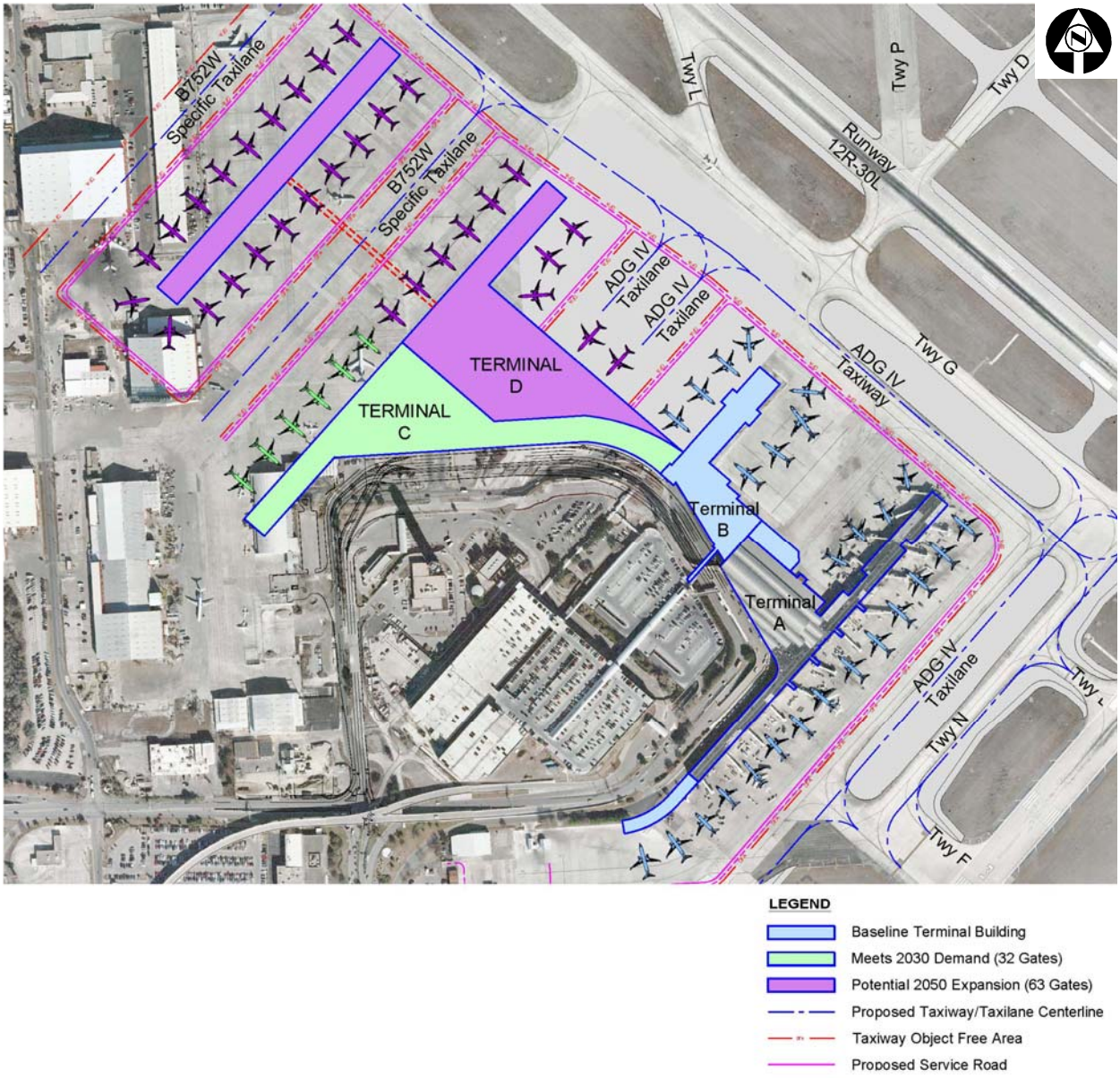


Figure 5-35: Terminal Alternative 6



Terminal Alternative 7

Under Terminal Alternative 7, Terminals C and D would be configured as one continuous passenger processing facility that would be approximately 200 feet wide, as shown on **Figure 5-36**. Terminals B and C would be connected via a 135-foot-wide extension of Terminal C, which would create a sense of one contiguous terminal area. Dual ADG III taxilanes would be provided between Terminals B and C. The clearance between the two piers would also be sufficient to accommodate a single ADG V taxilane. The primary advantages of this alternative are that it would meet 2030 and 2050 gate demand, provide a contiguous terminal area, and have an efficient airfield-terminal interface.

Terminal Alternative 8

Under Terminal Alternative 8, Terminal C would be a 200-foot-wide combination terminal/concourse that would operate with frontage gates, as shown on **Figure 5-37**. Terminal D would be constructed as a satellite concourse, which would be accessed from the main terminal via a below grade connector. The primary advantages of this alternative are that it would meet 2030 and 2050 gate demand and creates a sense of a contiguous terminal area. The primary disadvantage is that the construction costs for the satellite concourse and the below grade connector would be high.

Terminal Alternative 9

Under Terminal Alternative 9, Terminal C would be constructed on the west end of the terminal access road that would connect to Terminal B via a 50-foot-wide corridor, as shown on **Figure 5-38**. Terminal D would be constructed as a satellite concourse that would be accessed from Terminal C via a below grade connector. San Antonio Aerospace would have to be relocated to provide for the construction of Terminal C. The West Air Cargo Terminal would also have to be relocated to provide for construction of the satellite concourse. The primary advantages of this alternative are that it would exceed 2030 and 2050 gate demand. The primary disadvantage of this alternative is that it the narrow connector between Terminals B and C would not create a sense of a contiguous terminal area. Additionally, the construction costs for the satellite concourse and the below grade connector would be high. Furthermore, the 2030 and 2050 gate demands would require relocating several Airport tenants.

No-Build Terminal Alternative

The no-build alternative would not include any future terminal expansion and would be limited to accommodating forecast demand within the existing terminal facilities. As stated in Chapter 4, the existing gate capacity and terminal support functions are only adequate to meet forecast demand prior to 2020. Therefore, the no-build alternative would not be sufficient to accommodate future Airport needs.

Figure 5-36: Terminal Alternative 7

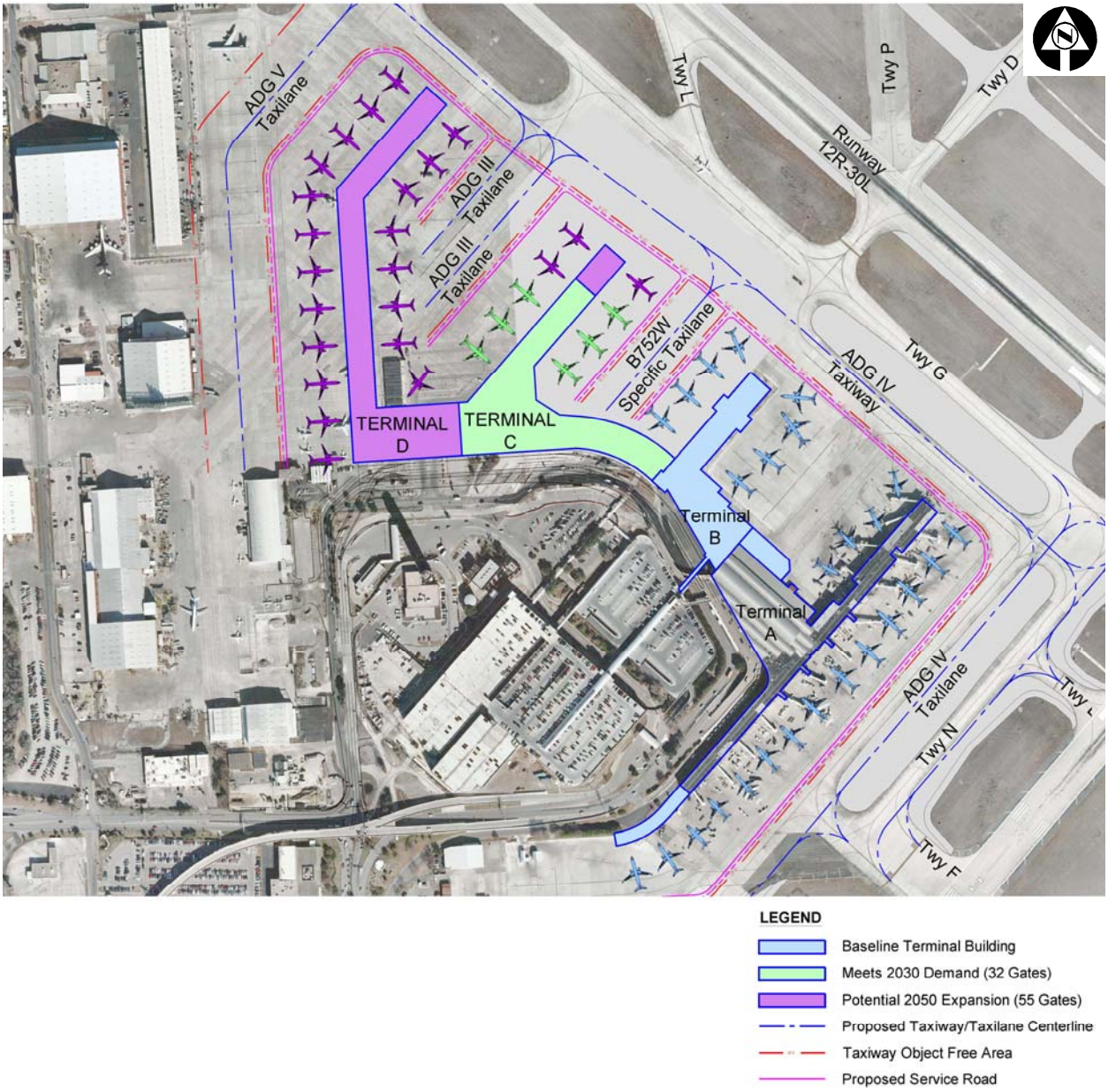


Figure 5-37: Terminal Alternative 8

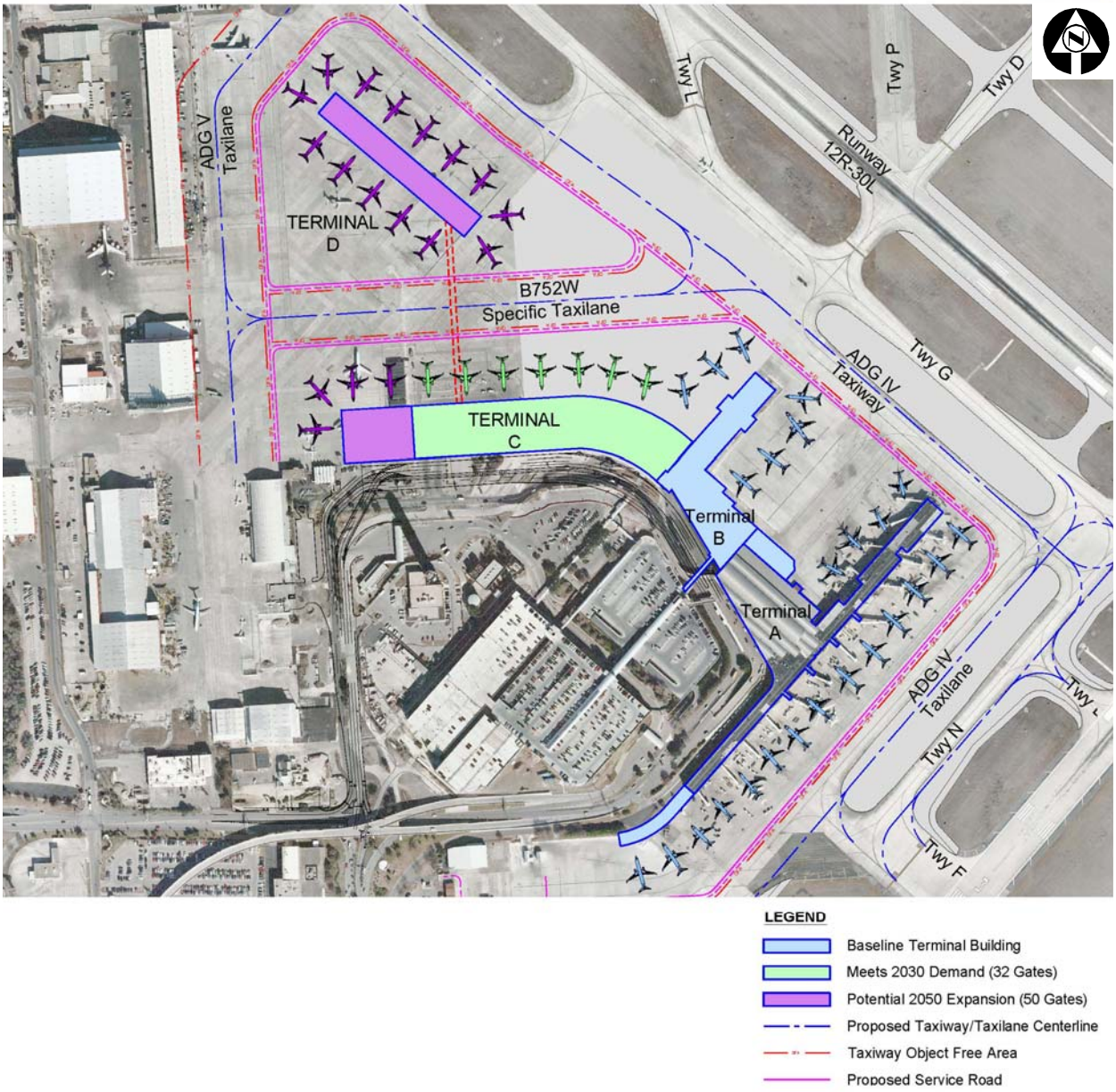
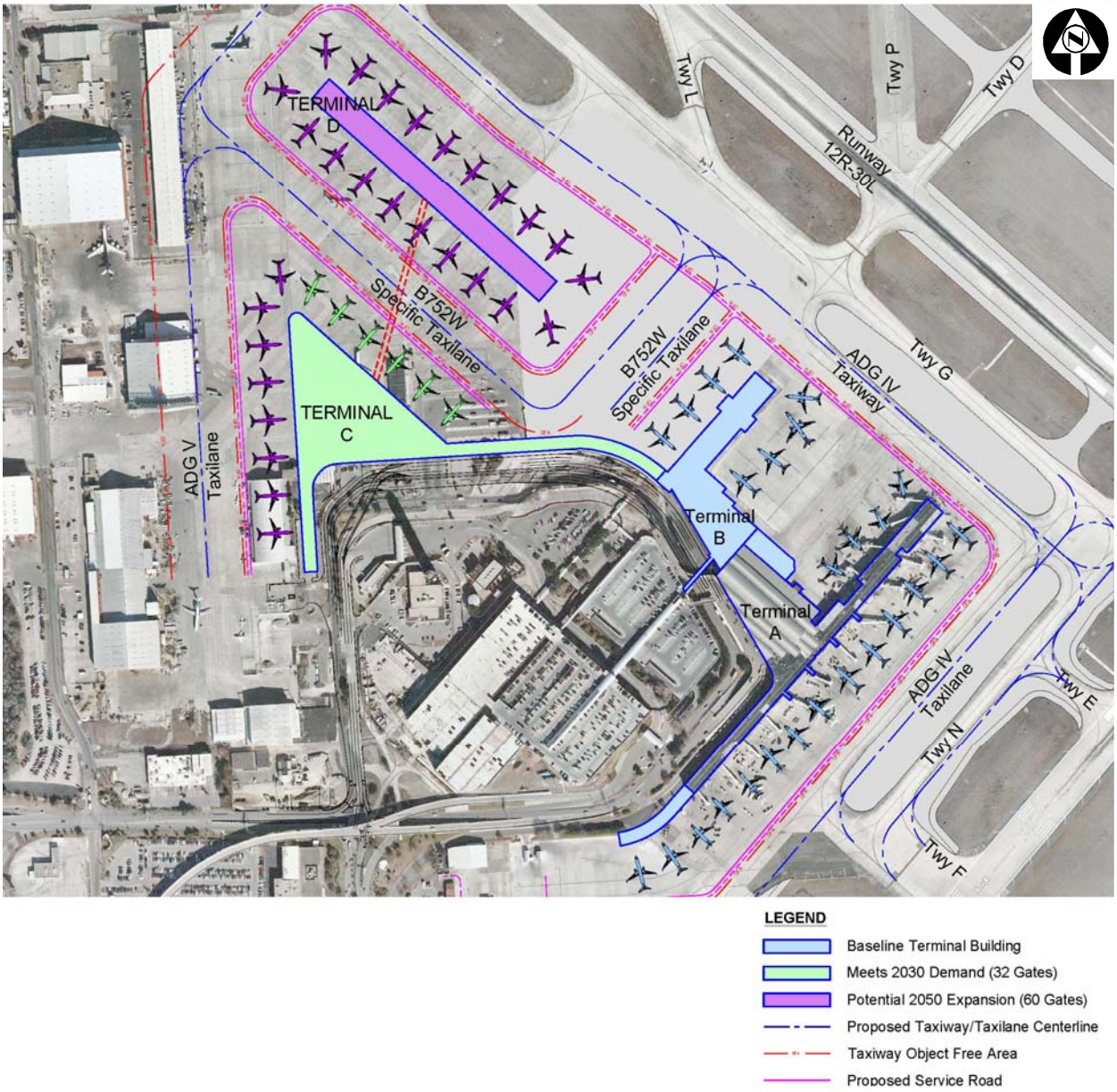


Figure 5-38: Terminal Alternative 9



Terminal Alternatives Preliminary Screening

Four terminal alternatives (2, 3, 4, and 9) were determined to be similar to other alternatives and were, therefore, eliminated from further consideration. The remaining alternatives, shown on **Figure 5-39**, were evaluated using the evaluation criteria derived from the City's goals and objectives for the Master Plan.

Figure 5-39: Preliminary Screening of Terminal Alternatives

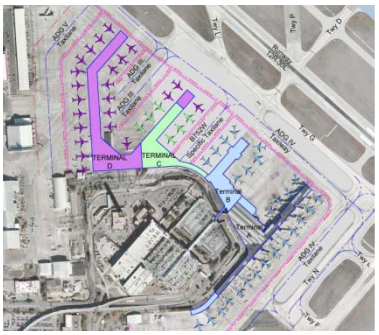
Alternative 1

Alternative 2

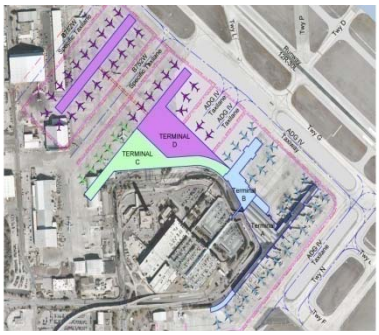
Alternative 3

Alternative 4

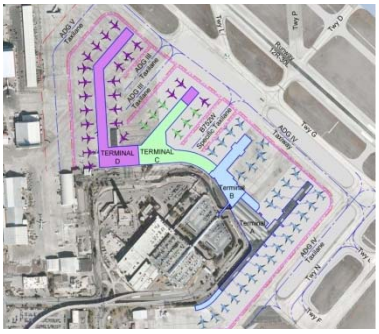
Alternative 5



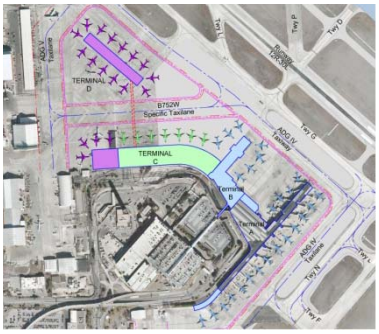
Alternative 6



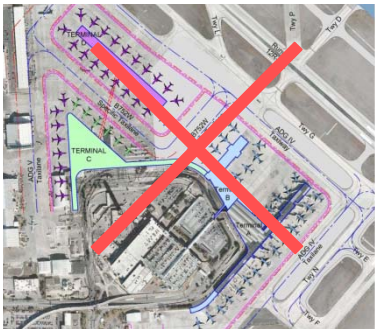
Alternative 7



Alternative 8



Alternative 9



Terminal Alternatives Evaluation

The final step of the terminal alternatives development process was to filter the short-listed terminal alternatives to establish the preferred terminal alternative. As shown in **Table 5-4**, it was determined that Terminal Alternative 7 would provide the most favorable terminal layout. A summary of the attributes of Terminal Alternative 7 is provided in the following section.

5.4.3 Recommendation

Terminal Alternative 7 was identified as the preferred terminal alternative as it would effectively create a sense of a unified terminal, exceed forecast gate demand, and provide for efficient aircraft movements. Additionally, this alternative would be relatively cost effective, as construction could be phased as warranted by gate demand. Furthermore, this alternative would provide adequate flexibility for unforeseen changes in forecast demand and airline operating characteristics. It should be noted that this alternative would also make excellent use of the existing elevated roadway and curb system, preserving the investment made in this infrastructure. With implementation of this alternative, the existing Terminal C design would have to be modified to reflect the recommended terminal concept.

The Terminal C design plans were analyzed, as described in **Appendix F**. An updated conceptual layout for Terminal C was developed as part of the preferred terminal alternative to demonstrate how the facility could:

- Meet 2030 facility requirements
- Adapt to changes in forecast demand
- Provide for incremental phasing
- Create a unified terminal complex
- Provide efficient passenger flows across all terminals (secure and nonsecure)
- Allow for intuitive wayfinding
- Minimize impacts to existing Airport operations

Figures 5-40, 5-41, and 5-42 depict the conceptual Terminal C layout for the mezzanine, departures, and arrivals levels, respectively A 120-foot-wide terminal connector would be provided between Terminal C and Terminal B, which would include large corridors, secure and nonsecure, to create a seamless connection through all terminals. Modifications to Terminals A and B would be required to create the secure-side corridor. Significant opportunity would exist to incorporate architectural design elements that would meet specific demand requirements in the future, as well as provide an appropriate “sense of place” for passengers. Additionally, the design of the terminal functions within Terminal C would provide a natural progression toward the development of Terminal D.

In accordance with Aviation Department guidance, an alternative design for the proposed secure connector in Terminal A was developed to demonstrate the potential of using the existing mezzanine level for secure passenger flows (see **Appendix H**). In this alternative, vertical circulation banks would be constructed on either side of the mezzanine level to provide transition from the departures level up to the mezzanine level. Approximately half of the mezzanine level would be used for the secure corridor and the remaining half could be used for airline club or storage space. However, this alternative is not recommended because of the

prohibitive cost to install two vertical circulation banks and the reduced level of service resulting from the requirement for passengers to make two level changes in transitioning between Terminals A and B.

Table 5-4: Evaluation of Terminal Development Alternatives

	Terminal Alternatives				
	1	**5**	**6**	**7**	**8**
Regional Socioeconomic Benefits					
Meets 2030 capacity needs	🟢	🟢	🟢	🟢	🟢
Allows long term growth of terminal / airfield	○	○	○	○	🟡
Meets runway length requirements	-	-	-	-	-
Optimizes nonterminal land development	○	○	○	○	○
Provides opportunity to serve as a regional gateway	○	🟡	🟢	○	○
Supports a regional rail system	○	○	○	○	○
Financial Feasibility					
Capital investment requirement	○	○	🟡	○	🟡
Ability to develop incrementally	🟢	🟢	🟡	🟢	🟡
Opportunities for nonairline revenue	🟡	○	🟢	○	○
Requirement for land acquisition	○	○	○	○	○
Operational Efficiency					
Airfield configuration optimizes aircraft movement	○	🟢	○	🟢	🟡
Promotes airline staff efficiency	○	○	🟡	🟢	🟡
Roadways, curbside, parking meet capacity needs	○	○	○	○	○
Ease of maintenance	○	○	🟡	○	🟡
Flexibility of facility for multiple users	○	○	🟡	○	🟡
Minimizes impact of construction phasing	○	🟢	🟡	○	🟡
Customer Service					
Minimizes walking distances / vertical movements	○	○	🟡	○	🟡
Sufficient space for passenger processing	○	○	○	○	○
Allows for intuitive wayfinding	○	○	🟡	🟢	🟡
Access to rental car facilities	○	○	○	○	○
Environmental					
Lifecycle resource use	-	-	-	-	-
Reuse of existing facilities	🟢	🟢	○	○	○
Impact on local community	○	○	○	○	○
Preservation of open space	-	-	-	-	-

🟢 Meets criterion
○ Neutral
🟡 Does not meet criterion

Figure 5-40: Proposed Terminal C Concept – Mezzanine Level (Level 3)

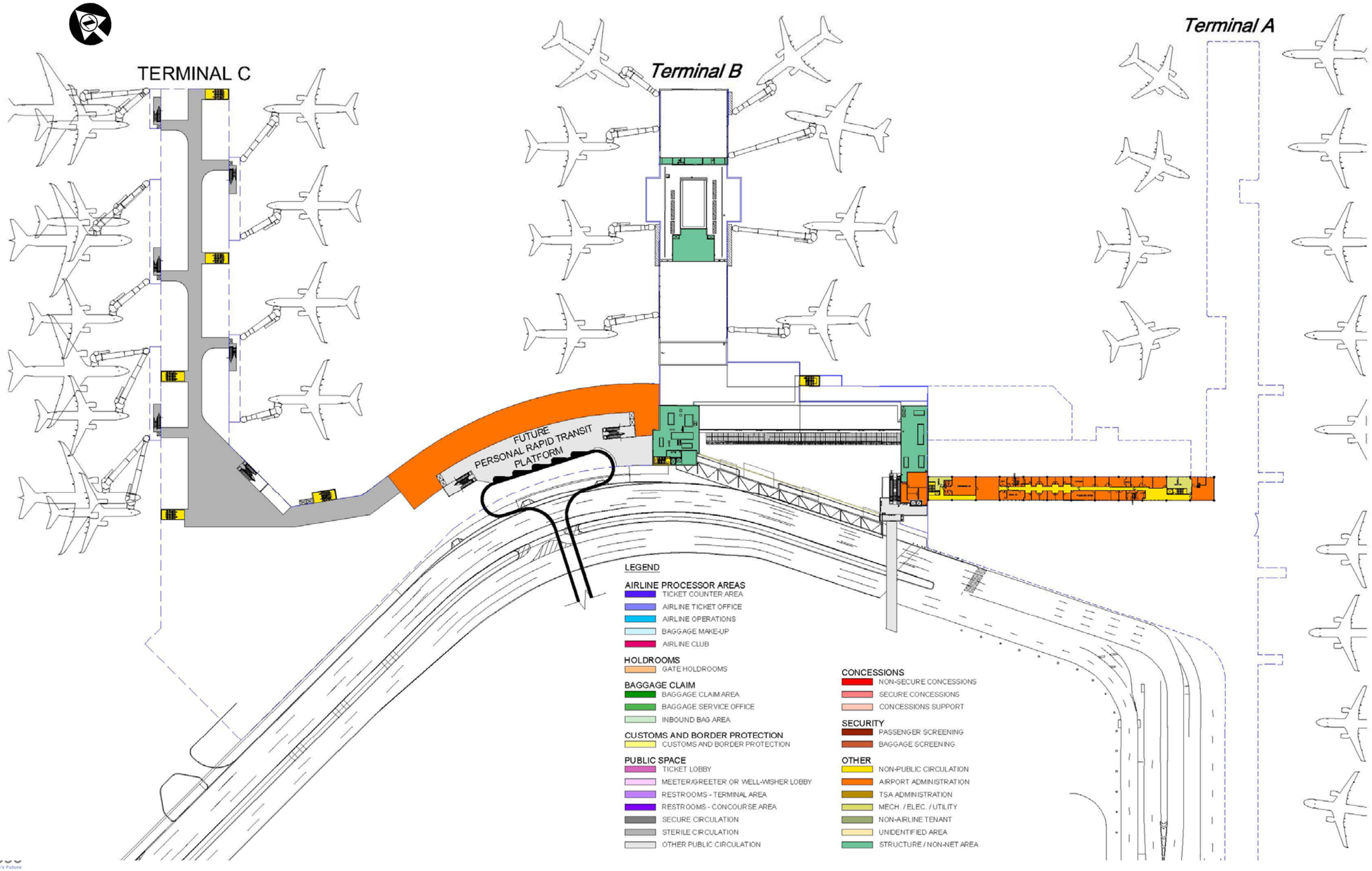


Figure 5-41: Proposed Terminal C Concept – Departures Level (Level 2)

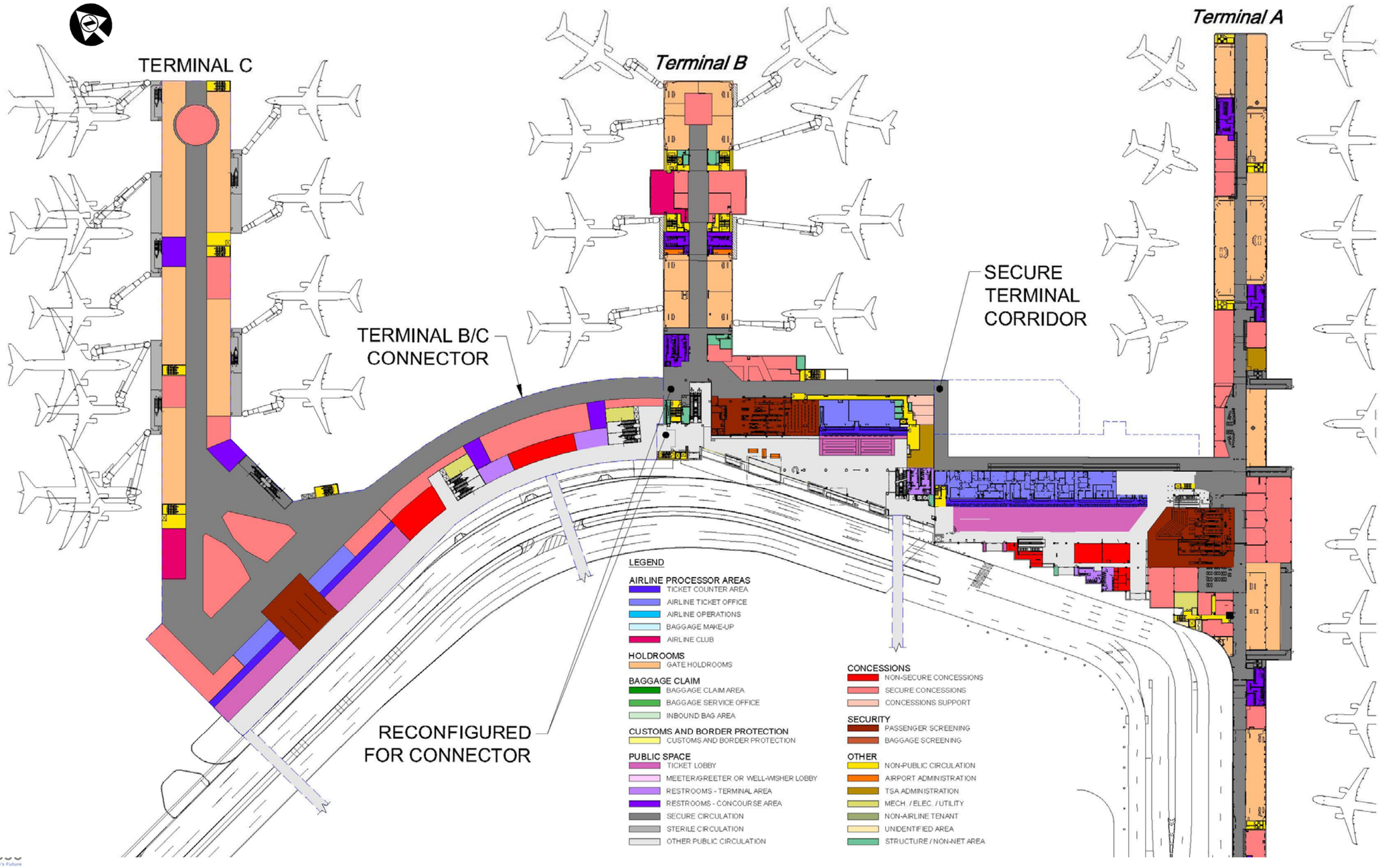
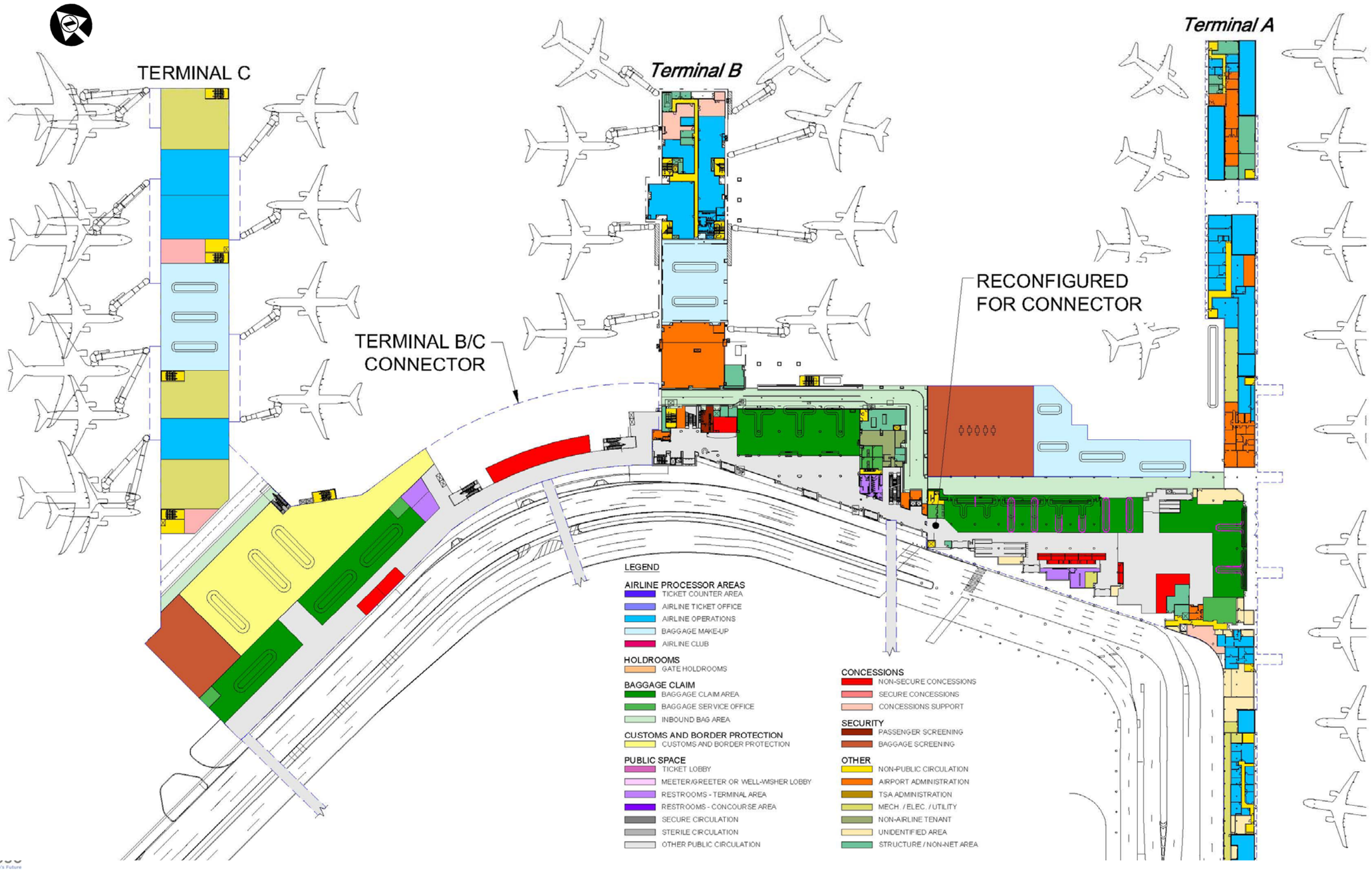


Figure 5-42: Proposed Terminal C Concept – Arrivals Level (Level 1)



5.4.4 Remain Overnight Aircraft Parking Apron

By 2030, it is projected that 25 ADG III and 3 ADG II RON aircraft parking positions will be required at the Airport. It was determined that all RON requirements prior to 2030 and Terminal C construction could easily be accommodated on the existing RON aprons and in the vicinity of demolished Terminal 2.

RON Apron Alternatives

Two RON aircraft layout alternatives that would accommodate 2030 RON aircraft apron demand in the existing terminal area were developed. Both alternatives feature similar taxilane configurations, with an ADG IV taxilane on the west side of Terminal C and an ADG V taxilane along the West Air Cargo Terminal building for access to the existing aircraft maintenance facilities.

RON Aircraft Layout Alternative 1

Figure 5-43 depicts RON Aircraft Layout Alternative 1, which would minimize the effect on existing facilities. The majority of aircraft (20) would be accommodated on the West RON Apron. It shoud be noted that several aircraft positions would be nested and require dependent operations, which would reduce the operational efficiency of the apron layout. However, the nested aircraft layout would occupy the least amount of space. As a result, only a few existing facilities would be affected. The City building would have to be demolished and a significant portion of the Nayak Aviation FBO apron would be used to meet the RON aircraft layout requirements.

RON Aircraft Layout Alternative 2

RON Aircraft Layout Alternative 2, shown on **Figure 5-44,** would maintain independent operations for all RON aircraft. However, the layout would requires demolition of all Nayak Aviation FBO facilities and reconstruction of the affected apron area. GA development alternatives are discussed in Section 5.7.

Recommendation

RON Aircraft Layout Alternative 2 is the recommended RON aircraft apron layout. This alternative would provide the most operationally efficient layout and use the existing terminal area for all RON positions; the nested aircraft layout in RON Aircraft Layout Alternative 1 could present substantial operational challenges for the airlines. Relocating the Nayak Aviation FBO facilities would provide for better use of the apron area for commercial passenger aircraft operations. Typically, it is recommended that general aviation and air carrier facilities be separate to minimize operational issues that result from mixing scheduled and unscheduled aircraft operations.

5.4.5 Ultra-Low-Cost Carrier Facility

The City has been approached in the past by an ultra-low-cost carrier to provide service at SAT. An ultra-low-cost carrier uses less space than a traditional airline, and generally operates

separately from the main terminal complex. As shown on **Figure 5-45**, a potential location for future operations of an ultra-low-cost carrier would be south of Terminal A. However, it is recommended that this area be used for the RON aircraft positions to provide for the accommodation of apron space requirements.

Figure 5-43: Proposed RON Aircraft Layout – Alternative 1

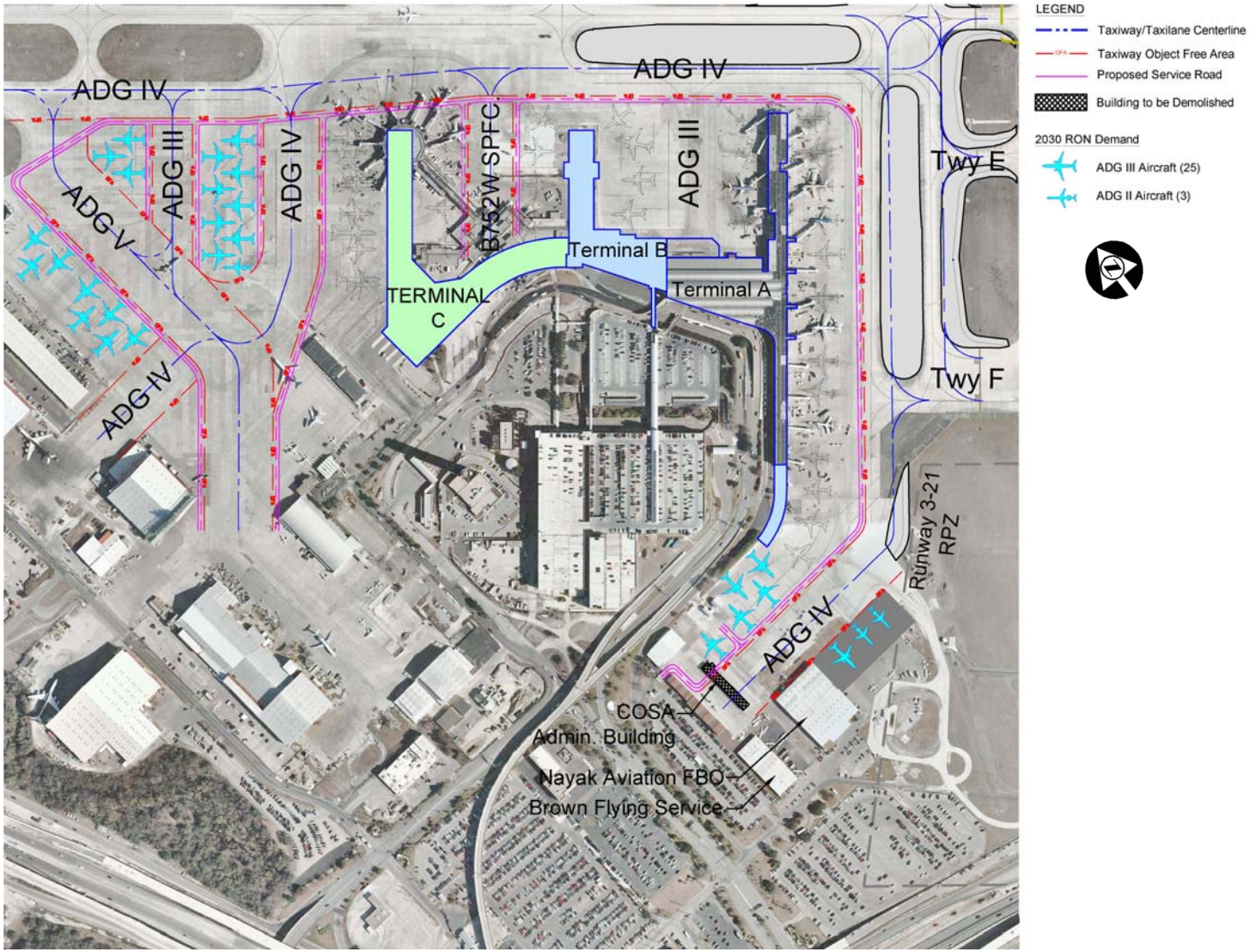


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Figure 5-44: Proposed RON Aircraft Layout – Alternative 2

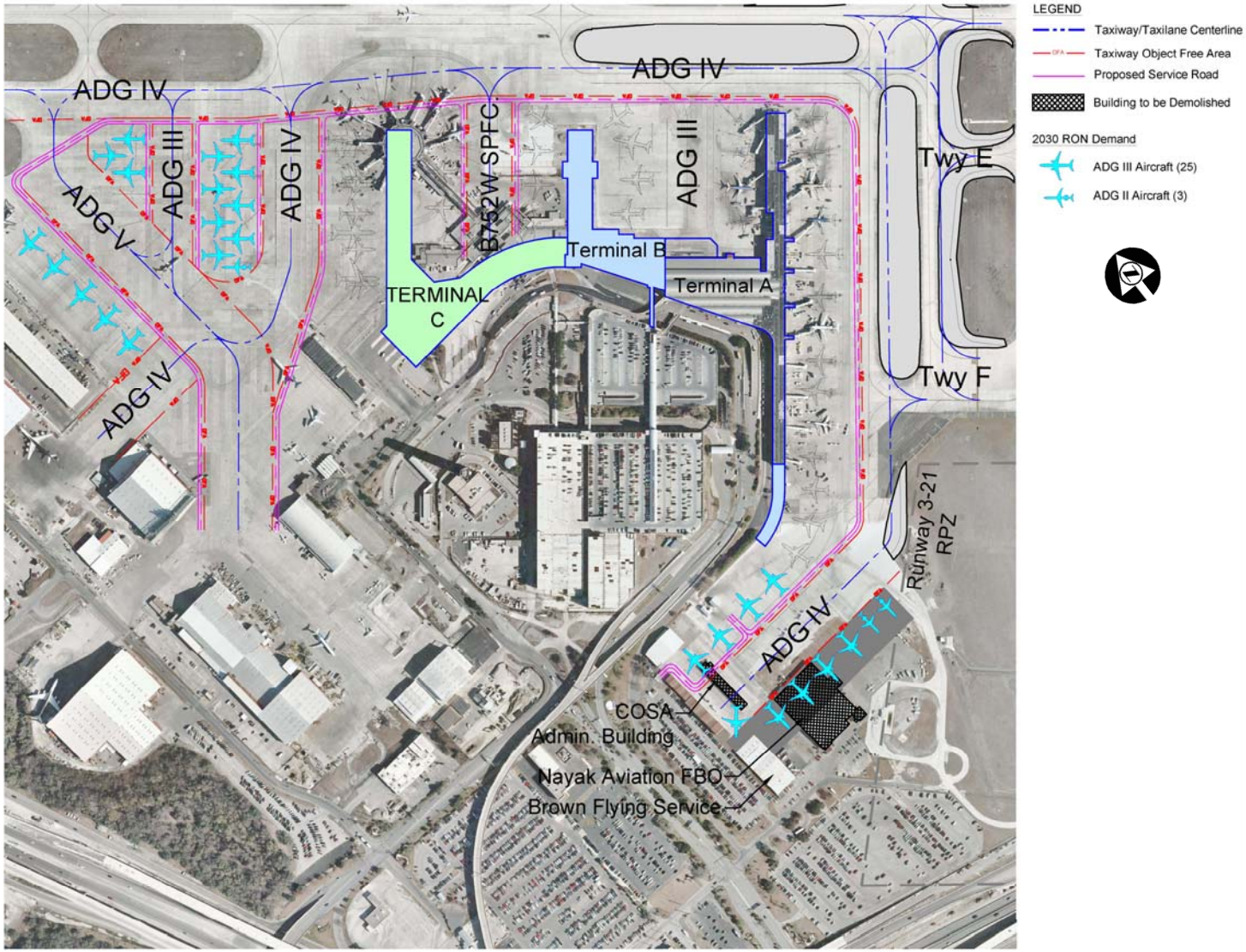

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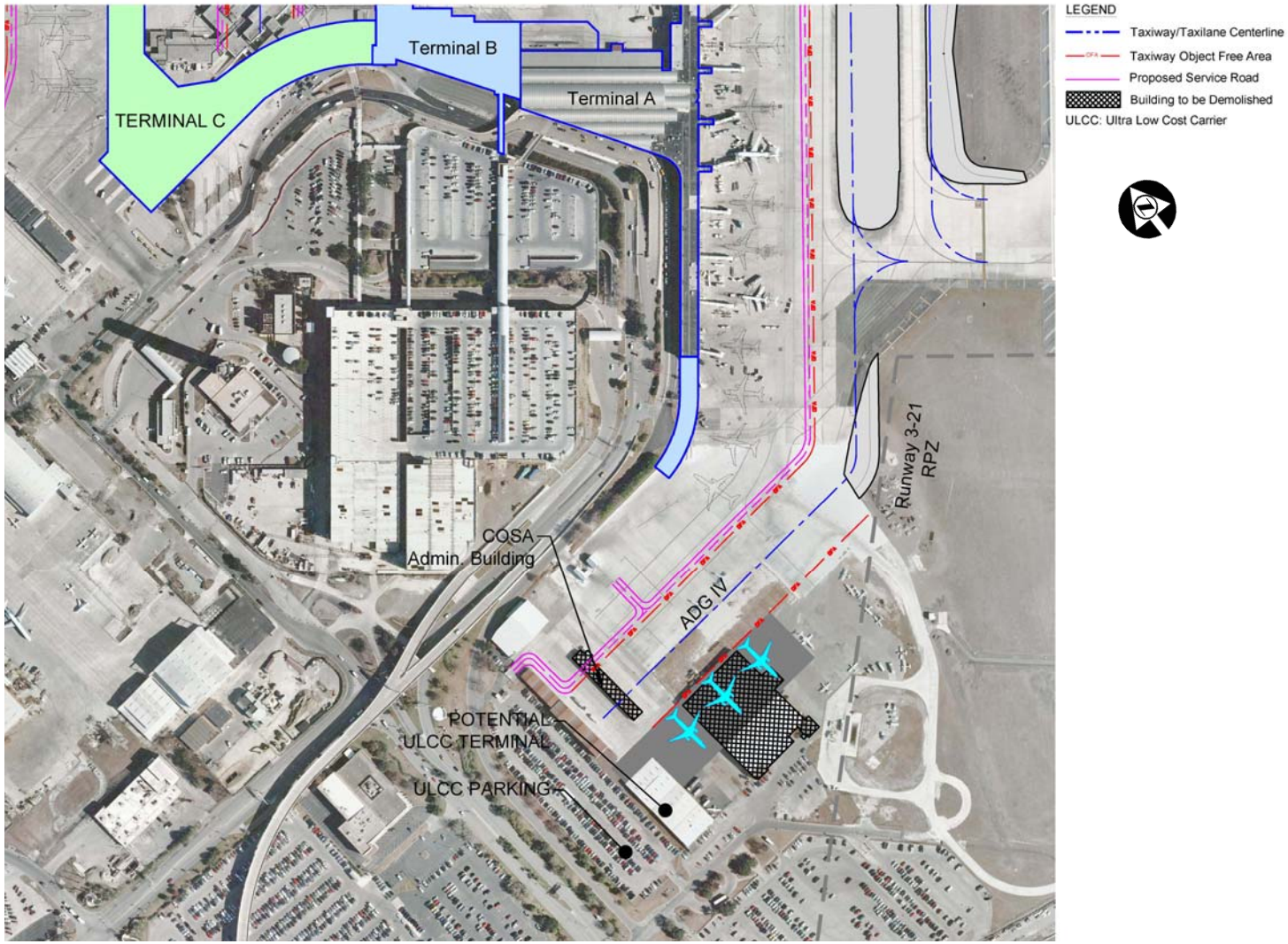
Figure 5-45: Potential Ultra Low Cost Carrier Location



5.5 LANDSIDE DEVELOPMENT ALTERNATIVES

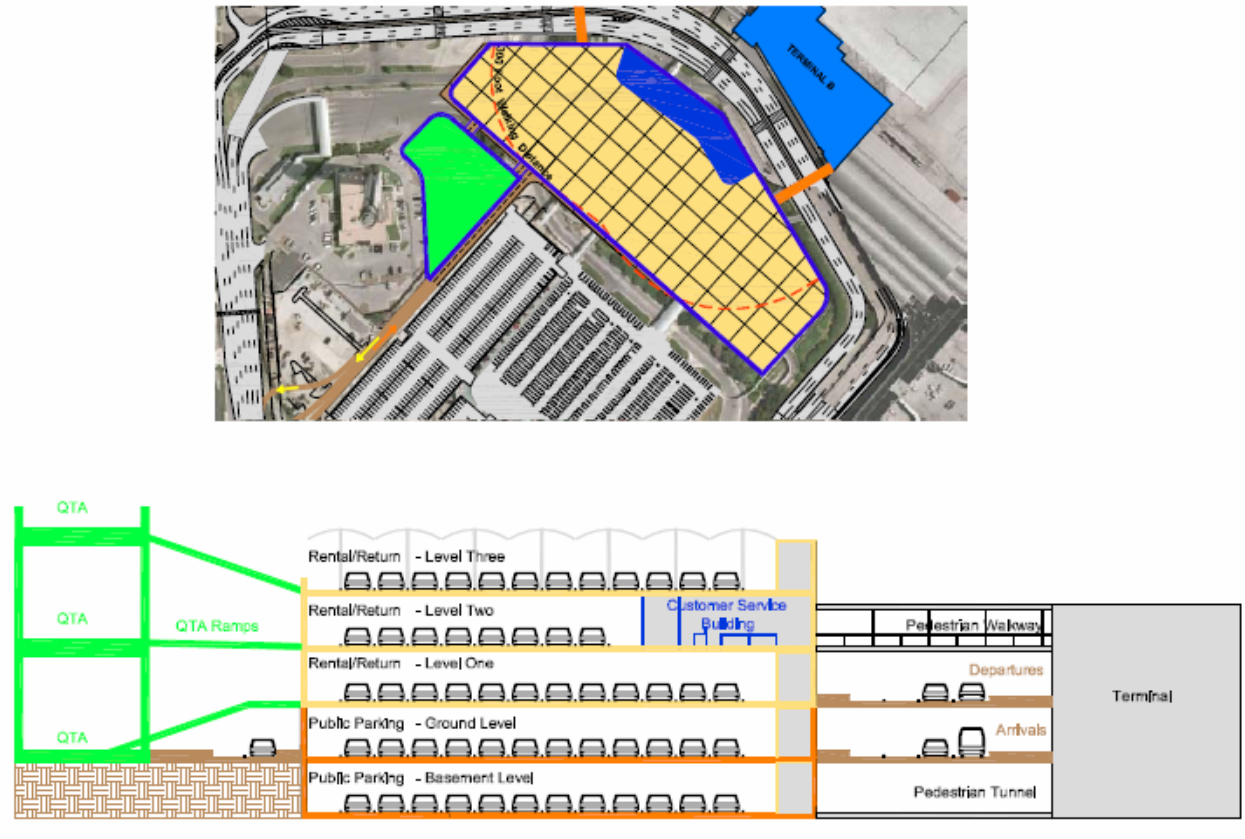
As described in Chapter 4, the terminal area roadways and curbs currently being constructed are projected to be adequate through the 2030 planning horizon. However, a shortfall is projected in both public and employee parking facilities during this period. In addition, it is desirable to address the relatively poor rental car customer level of service at the Airport through the development of a consolidated rental car facility (CONRAC). A 2008 study[1] explored various potential sites and configurations for a CONRAC, independent of the need to provide expanded parking facilities. The analysis conducted for this Master Plan builds on that 2008 study to develop and evaluate alternative sites and concepts that address the overall landside issues at SAT. In particular, the CONRAC study identified the need for about 2,600 ready and return spaces. A comparison of public parking requirements in 2030 with current parking supply shows a small hourly surplus, but it is projected that an additional 1,200 long-term spaces and 300 economy spaces will be required. An additional 300 employee parking spaces will also be required.

5.5.1 Parking Alternatives Analysis

In the 2008 CONRAC study[1], 12 potential sites for the new facility were analyzed. The sites were screened based on proximity to the terminal area, ease of access and wayfinding, size and configuration, and the ability to accommodate the entire Airport rental car market, as well as customer service, rental car operations, potential environmental impacts, site considerations, and Airport compatibility. A site located within the terminal loop (Site 1, see **Figure 5-46**) was selected, at that time, as the preferred location for a CONRAC and a preliminary concept was developed. The concept would require removal of the existing three-level hourly parking garage and replacing it with an expanded five-level garage with hourly parking on the lower two levels and rental car ready/return spaces and service center on the upper three levels. A quick turnaround (QTA) area would be located as shown in green on the figure. The preferred concept also included an elaborate roadway system for access to and from the CONRAC. However, it was determined in the analysis for this Master Plan that the roadway system is not needed, and that simplified ramps in and out of the facility could be used without adversely affecting the terminal roadways' levels of service.

[1] Ricondo & Associates, Inc., *Consolidated Rental Car Facility Preliminary Feasibility Report*, 2008.

Figure 5-46: Preferred Consolidated Rental Car Facility Location, Site 1 Loop Road



Source: Ricondo & Associates, Inc., *Consolidated Rental Car Facility Preliminary Feasibility Report*, 2008.

The preferred concept from the 2008 CONRAC study included an expanded five-level garage in place of the existing three-level garage and surface lot across the curbside roads adjacent to the terminals. The existing hourly garage would be demolished after the new five-level portion to the west of the garage is completed, and then the demolished portion of the garage would be reconstructed as a five-level facility. A separate structural study was underway at the time of this analysis to investigate the structural integrity of the existing hourly garage, which may support this approach. On the other hand, if the study shows that the existing garage still has an extensive useful life, a second alternative has been explored that could avoid the demolition and reconstruction costs. Both alternatives are discussed below in the context of other parking requirements. In both cases, the economy parking was assumed to be expanded into the existing Avis rental car lot to provide capacity needed for 2030. Parking for terminal area employees located just to the north of Loop 410 was assumed to be expanded into an adjacent area to be made available by relocation of the current tenants. Alternatively, areas south of Loop 410, which would be vacated by the rental car companies that relocate to the CONRAC, could be considered for some or all employee parking.

Landside Alternative 1 – Demolish the Existing Hourly Parking Garage

In the preferred CONRAC concept, with the lower two levels of the new garage devoted to hourly parking and the upper three levels devoted to rental car operations, about 2,000 spaces

would be available for hourly parking. This number of available spaces is more than the number estimated in the 2008 study to be required by 2030 by more than a factor of two. A modified version of the CONRAC concept is incorporated in the integrated Landside Alternative 1. In this alternative, hourly parking would be provided only on the lowest (below grade) level of the new garage, with rental car operations on levels 2, 3, and 4. Expanded long-term parking would be accommodated on level 5, accessed using vehicle ramp connections back to level 4 of the existing long-term garage (level 1 of which is at grade). To achieve the required number of long-term parking spaces, it may also be necessary to include long-term parking spaces on that level, in the "gap" between the existing garages. This concept is shown schematically on **Figure 5-47.**

Landside Alternative 2 – Retain the Existing Hourly Parking Garage

As shown on **Figure 5-48**, under Landside Alternative 2, the existing hourly garage would be retained as a three-level structure. A six-level parking and rental car structure would be added to the west, and multiple levels of the gap between the existing garages would be filled in. Hourly parking would only be provided at the lowest (below grade) level, with rental car operations on levels 2 and 3 of the existing hourly garage and on levels 2 through 5 of the new portion of the facility. Long-term parking would be provided on level 6 of the new structure and on three levels of the structure in the gap.

Landside Alternative 3 – No Build

Under the no build alternative, it was assumed that no further landside development would occur at the Airport. Rental car companies would continue to operate from predominantly off-Airport locations. No additional City-owned Airport parking would be provided. The no-build alternative would not meet rental car customer service needs, as the existing rental car facilities are dispersed throughout the Airport, presenting challenges for rental car customers.

Figure 5-47: Landside Alternative 1

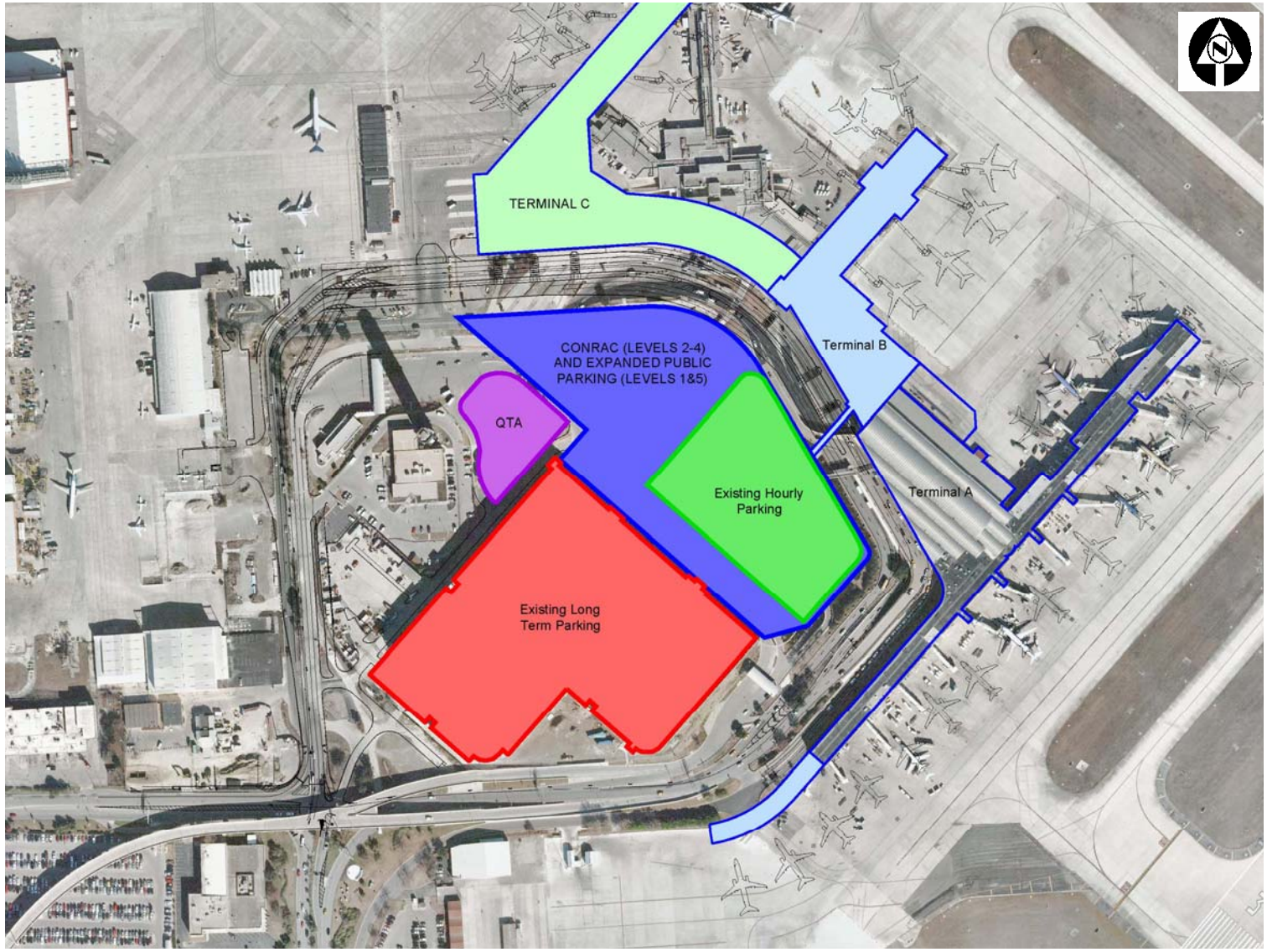


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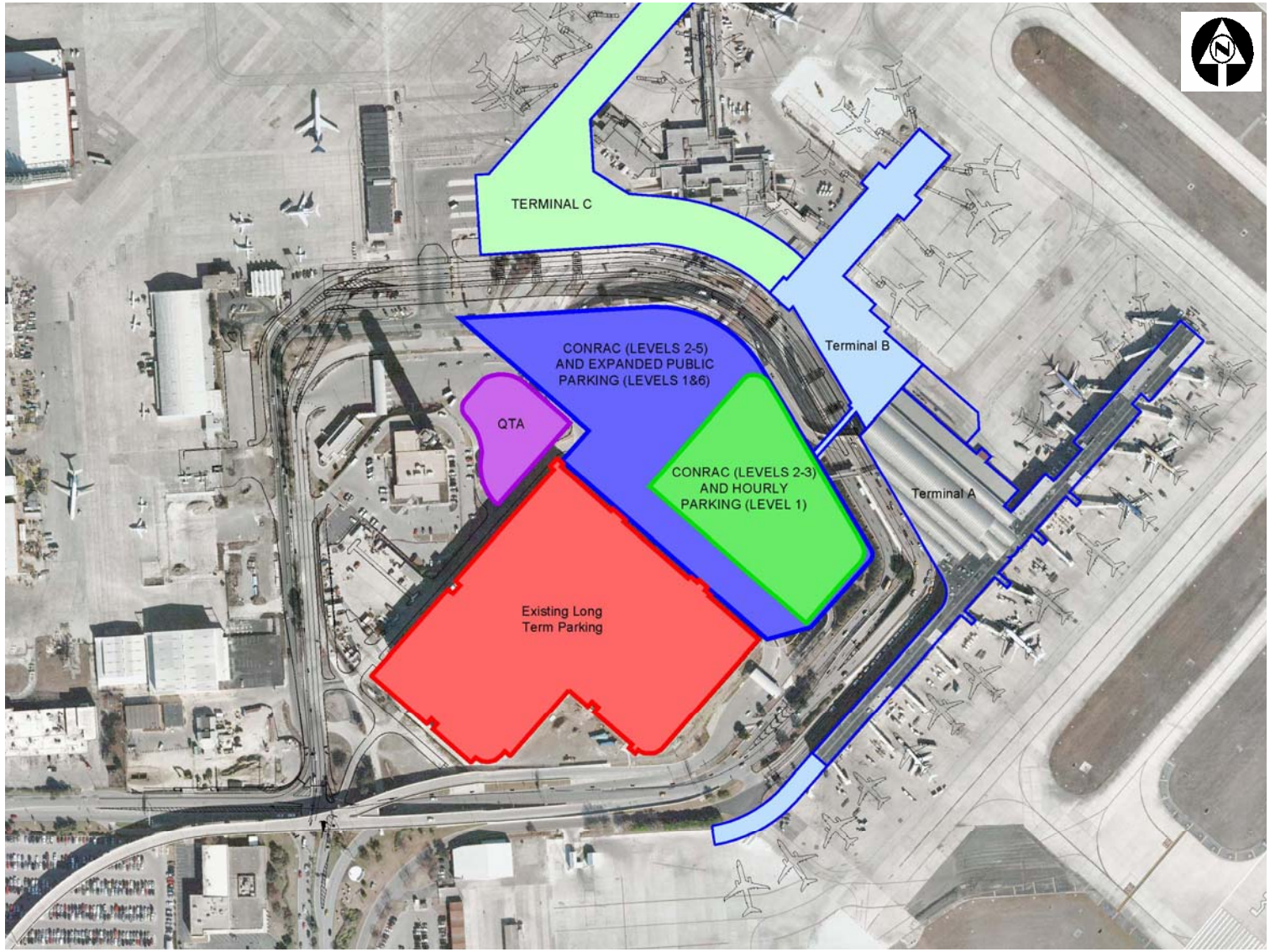
Figure 5-48: Landside Alternative 2



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5.5.2 Alternatives Evaluation

The two build alternatives are similar in most functional respects. Adequate capacity would be provided with both alternatives to meet 2030 parking and CONRAC requirements. Both would fit within airspace geometric constraints and the ATCT sight lines. Landside Alternative 1 would provide somewhat more flexibility in arranging rental car company spaces, with more contiguous areas available on three complete levels versus two complete levels and two half-levels under Landside Alternative 2. However, Landside Alternative 1 would cost about $60 million more than Landside Alternative 2. In addition, Landside Alternative 2 could be completed sooner, with fewer phases of construction needed.

In the no-build alternative, parking demand would not be fully accommodated, causing many people to alter their mode choice for accessing the Airport or use off-Airport parking, which would need to be expanded by other parking facility operators. Overall, there would be significant loss of revenue for the Airport.

The existing economy parking lot, combined with the current Avis rental car area, would accommodate requirements in 2030. However, if this land were needed for an alternative use, economy parking could be relocated to the current rental car areas south of Loop 410.

Similarly, the existing terminal area employee parking could be expanded to the north, into an existing parking lot used by tenants that are to be relocated. However, if this land were needed for an alternative use, terminal area employee parking could be relocated to the current rental car areas south of Loop 410.

5.5.3 Recommendation

It was concluded in the report on the structural integrity of the garage that the garage has many years of useful life remaining; therefore, Landside Alternative 2 is preferred because of cost and schedule savings. The preferred concept for all parking facilities is shown on **Figure 5-49**. As also depicted on the figure, additional parking could be accommodated on the existing ATCT site once the ATCT is relocated in the long term.

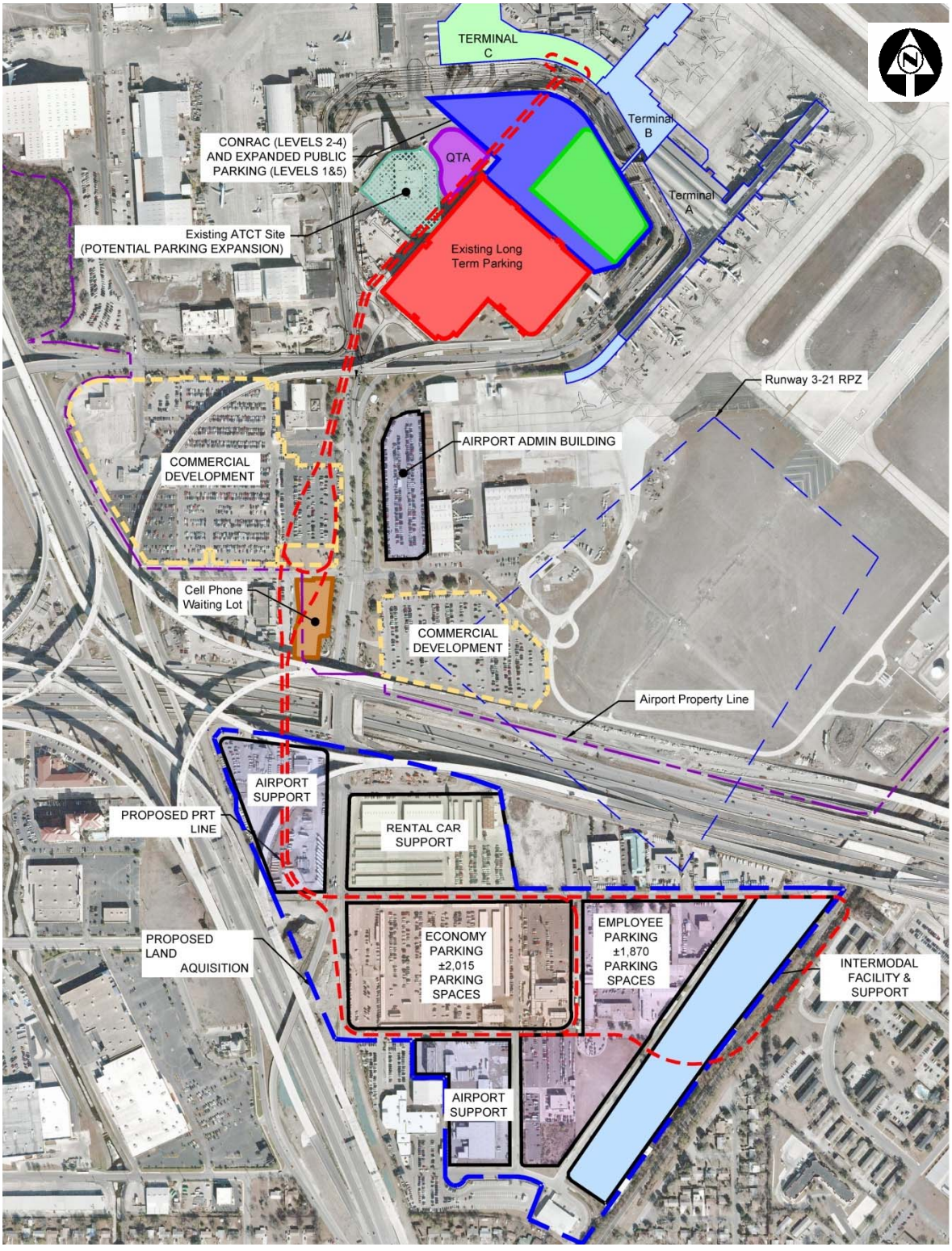
5.5.4 Rail Service Alternatives Analysis

With the potential for future rail service from the rail corridor adjacent to Wetmore Road to the east of the Airport, alternatives for connecting rail service to the terminals have been explored. The simplest and least expensive approach would be to provide shuttle bus service from the railway stations, with a rail platform and adjacent bus stop along the rail corridor, and bus dropoffs and pickups at the terminal curbs. Potential locations for the rail platform could be north or south of Loop 410; however, more options are available to the south. The final location for the rail platform will be determined by the Lone Star Rail District, which is leading the planning efforts for the Austin-San Antonio commuter rail project.

Another, more expensive approach would be to develop a fixed guideway connection to the terminals, using technologies such as an automated people mover (APM) or a newer technology known as personal rapid transit (PRT). APMs, or computer-controlled trains, have been used extensively at airports around the world, especially to connect terminals and gate area concourses, but also for landside connections. PRT is operated with much smaller

automated vehicles that have much shorter headways between successive vehicles along the guideway. The smaller PRT vehicle size allows the use of much smaller and less expensive guideways and stations. The first PRT system deployed at an airport opened at London Heathrow Airport in 2009, connecting between a remote parking garage and the new Terminal 5. The larger, more expensive APMs can accommodate higher volumes of passengers, but PRTs would provide adequate capacity for the expected demand at SAT. It is doubtful that the cost of either type of system ($50 million-$100 million) would be justified by the demand projected for 2030; however, the proposed PRT alignment was taken into consideration in the planning of other Airport facilities. Figure 5-49 illustrates a possible PRT alignment that could connect the rail service and other possible locations, such as remote employee and economy parking, with the terminals.

Figure 5-49: Recommended Landside Alternative



5.6 AIR CARGO DEVELOPMENT ALTERNATIVES

Air cargo tonnage is forecast to increase 4.1 percent per year between 2009 and 2030, and there is an immediate need for facilities expansion. Furthermore, achievement of the long-term trend would require a major expansion of the existing cargo complex to accommodate the requirements. Site locations considered and the recommended plan for expanding the Airport's air cargo facilities throughout the planning period are discussed below.

5.6.1 Background

Air cargo facilities at the Airport can be classified in two categories:

- Belly cargo facilities: belly cargo is carried in the bellyhold compartment of passenger airline aircraft in space not needed for passenger baggage.
- All-cargo facilities: all-cargo facilities refer to those facilities related to air freight distributors; integrated carriers, such as UPS or FedEx, that provide complete door-to-door cargo services; and the all-cargo airlines that provide airport-to-airport service using all-cargo aircraft.

Existing belly freight facilities at the Airport are adequate through 2030. However, all-cargo facilities require additional processing/warehousing space and cargo apron to meet forecast demand. **Table 5-5** summarizes the estimated all-cargo facility requirements for 2030.

Table 5-5: All-Cargo Facility Requirements

	Existing	Estimated 2030 Requirements
Cargo Building Area (square feet)	104,000	215,010
Building Deficiency	-	*111,010*
Cargo Ramp Area (square yards)	117,340	301,000
Ramp Deficiency	-	*183,660*
Cargo Landside Area (square feet)	339,230	215,010
Landside Deficiency	-	-
Cargo Land Area (acres)	34.4	74.4
Acreage Deficiency		*40*

Approximately 40 additional acres of land would be needed to meet the 2030 requirements for all-cargo facilities. The air cargo requirements analysis was focused on identifying available on-Airport land that would be able accommodate the cargo demand. Layouts were prepared to determine how the sites could be developed, and to ensure that facility requirements could be accommodated. However, the layouts are conceptual and should be adjusted to meet the demands and requirements of specific tenants.

5.6.2 Site Selection

On-Airport land available for cargo development is limited by the locations of environmentally sensitive sites and previously planned development. Existing cargo facilities are located on the east side of the Airport along Wetmore Road. Given the size of the parcel required, the only areas on the Airport that could accommodate this activity are immediately north and south of the existing cargo facilities. The existing site has distinct advantages for cargo operations, as follows:

- The site is able to accommodate the anticipated 2030 facility requirements. Additionally, because of the limited land available for development on-Airport, this site provides the best opportunity for expansion without land acquisition.
- Significant capital investment in infrastructure is not necessary because roadways and utilities are already in place.
- The location on the Airport is isolated from other Airport land uses. The cargo carriers operate differently from other Airport tenants. Therefore, having a separate and consolidated location is recommended.
- The site has good landside access via Wetmore Road, Loop 410, and U.S. 281.
- The site is adjacent to Runway 3-21. As discussed under airfield alternatives (Section 5.3), it is recommended that Runway 3-21 be extended to 10,000 feet, the runway length necessary to accommodate the widebody cargo aircraft expected to operate at SAT at their maximum takeoff weight.

Disadvantages of the existing site are:

- The airfield is most commonly operated in an east flow configuration. In this configuration, cargo aircraft have long taxiing distances between Runway 12R-30L and the cargo area. Additionally, because of the location of this site, cargo aircraft must cross active runways when taxiing to and from Runway 12R-30L.
- As the expansion area approaches the north boundary of the Airport, the terrain slopes down, requiring significant earthwork to create a usable location. Further analysis to determine the level of effort required to construct facilities to the north, and the associated capital costs, should be conducted.
- With the current airfield configuration, cargo growth potential to the south is limited by the Runway 30R RPZ and Runway 12L departure surface. Development on the entire site is also restricted by the Runway 3-21 FAR Part 77 transitional surface. These constraints will remain when Runway 12L-30R and Runway 3-21 are extended. Also, the remote transmitter/receiver (RTR) is located south of the cargo apron. Proposed expansion is set back from the RTR to achieve acceptable clearance, but potential signal interference should be analyzed before the expansion is designed.

5.6.3 Development Alternatives and Evaluation

Four development alternatives on the existing cargo site that would accommodate the 2030 requirements were evaluated, and are described below.

Cargo Development Alternative 1

Cargo Development Alternative 1 consists of a combination of 3.5 acres to the south of the existing cargo area with up to two ADG III aircraft positions, and 42 acres to the north of the existing cargo area with up to 10 aircraft positions, as shown on **Figure 5-50**. Development of this site would accommodate immediate expansion needs to the south, and provide long-term development capabilities to the north. Significant earthwork would be needed to develop the site, but development in this area would avoid environmental issues associated with the Green Light site and the adjacent on-Airport plume caused by illicit discharges of hazardous substances. The Green Light site, now vacated, is located immediately north of the existing cargo apron. The first widebody aircraft position east of the potential cargo apron taxilane would have a minor FAR Part 77 tail penetration.

Cargo Development Alternative 2

Cargo Development Alternative 2 consists of a combination of 3.5 acres to the south of the existing cargo area with up to two ADG III aircraft positions, and 42 acres to the north with up to 12 aircraft positions, as shown on **Figure 5-51**. Development of this site would accommodate immediate expansion needs, and provide phased long-term development capabilities. Significant earthwork would be needed to develop the site. Additionally, environmental cleanup would be required before development is initiated because of the plume located immediately west of the Green Light site. Development could be phased to construct the northern two-thirds of the cargo complex while environmental cleanup is ongoing. The first five aircraft positions would have minor FAR Part 77 tail penetrations.

Cargo Development Alternative 3

Cargo Development Alternative 3 consists of a 50-acre development north of the existing site with up to 13 aircraft positions, as shown on **Figure 5-52**. A significant initial investment would be needed to develop this site. Phased construction is possible, but significant earthwork would be required. Development in this area would avoid environmental issues associated with the Green Light site and the adjacent plume. The first widebody position east of the new cargo apron taxilane would have a minor FAR Part 77 tail penetration.

Cargo Development Alternative 4

Cargo Development Alternative 4 consists of a 50-acre development north of the existing site with up to 11 widebody aircraft positions is shown on **Figure 5-53**. Similar to Cargo Development Alternative 3, significant investment would be needed early to develop this site. Additionally, the site would require environmental cleanup before development could be initiated. Phased construction beginning in the area north of the existing site would be possible, but significant earthwork would be needed even to meet immediate needs. Because of the earthwork and environmental issues, this alternative would likely be the most costly of all alternatives evaluated. There would be no FAR Part 77 tail penetration issues because the apron would be further east than under the previous alternatives.

Figure 5-50: Cargo Development Alternative 1

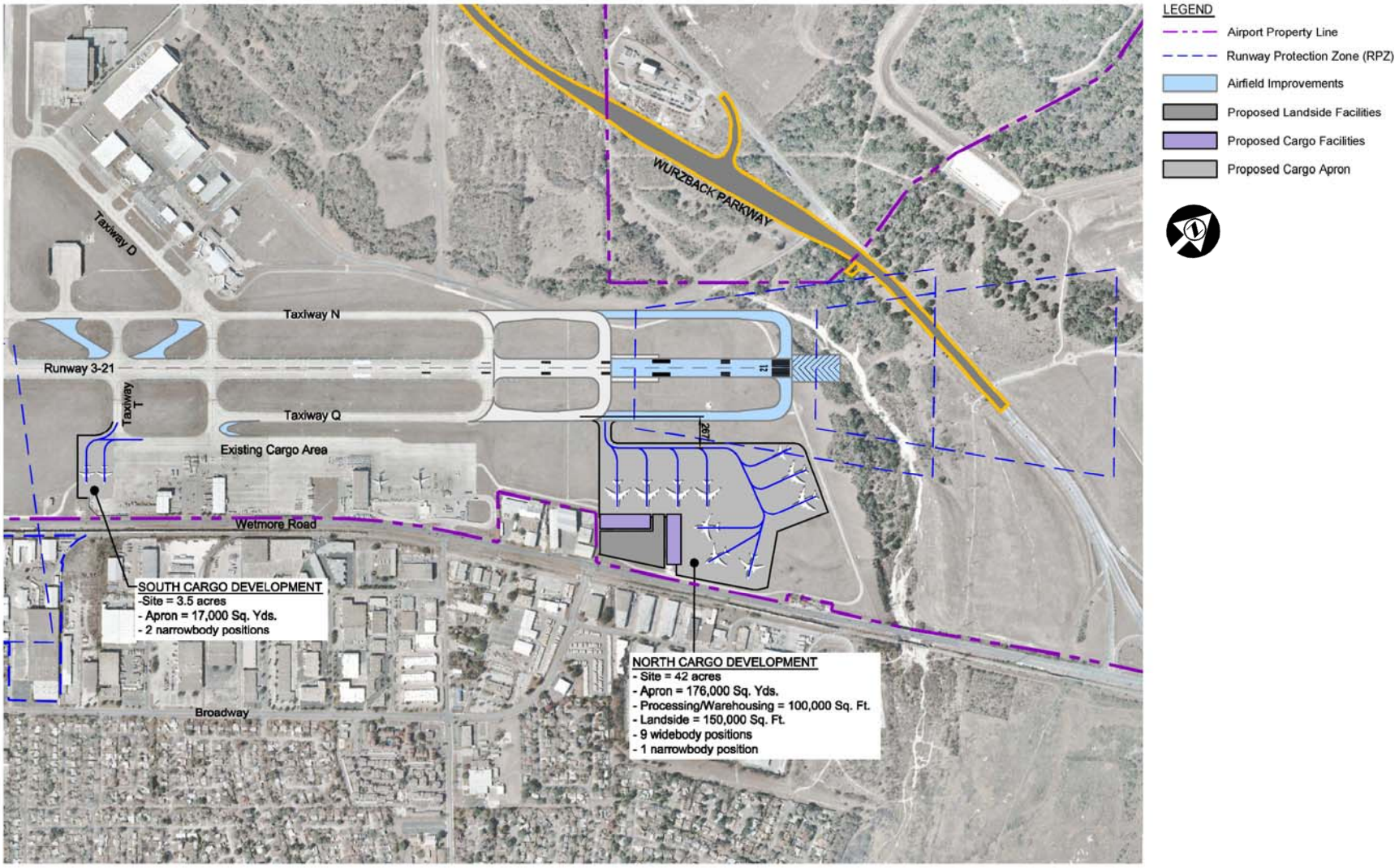


Figure 5-51: Cargo Development Alternative 2

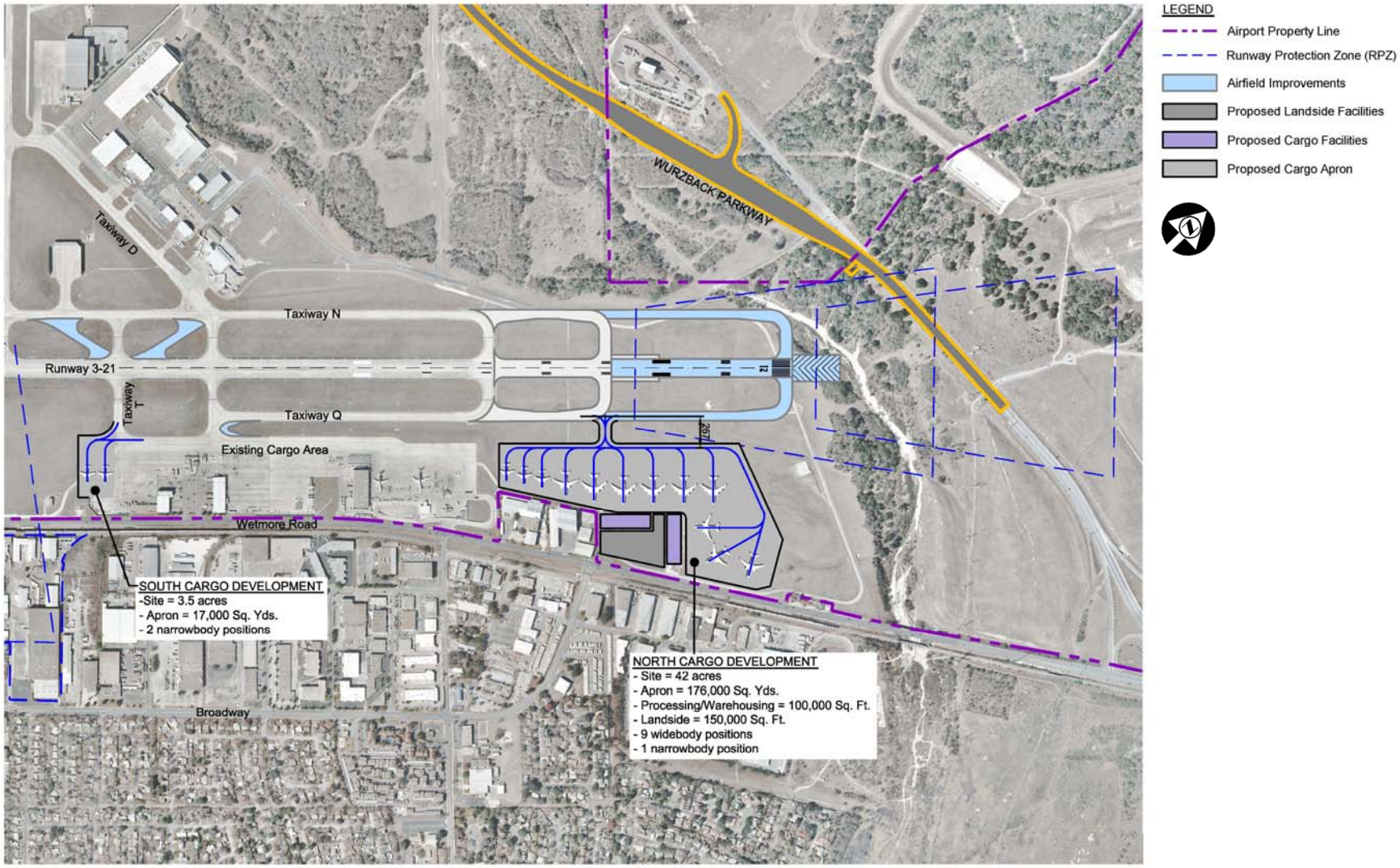


Figure 5-52: Cargo Development Alternative 3

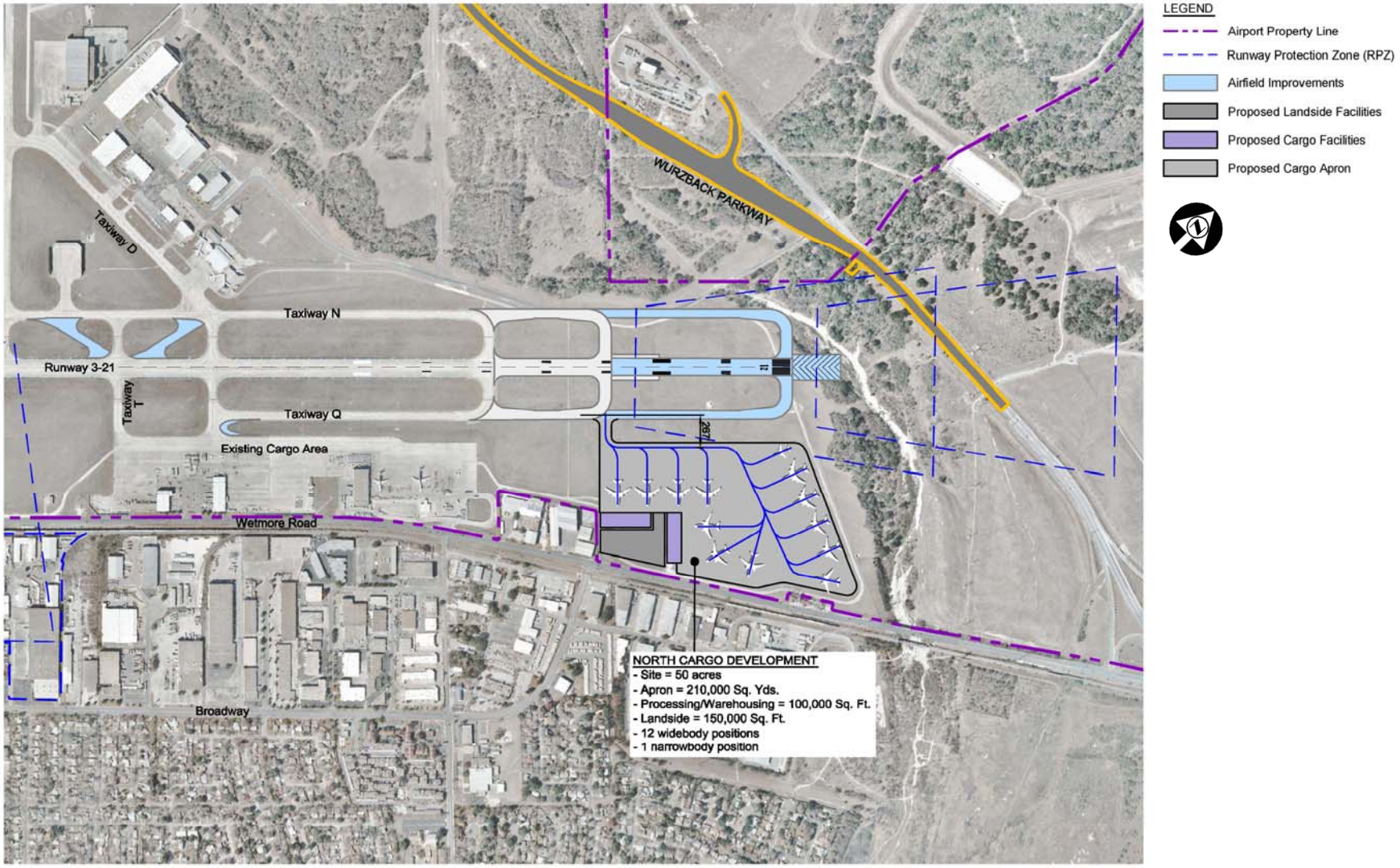


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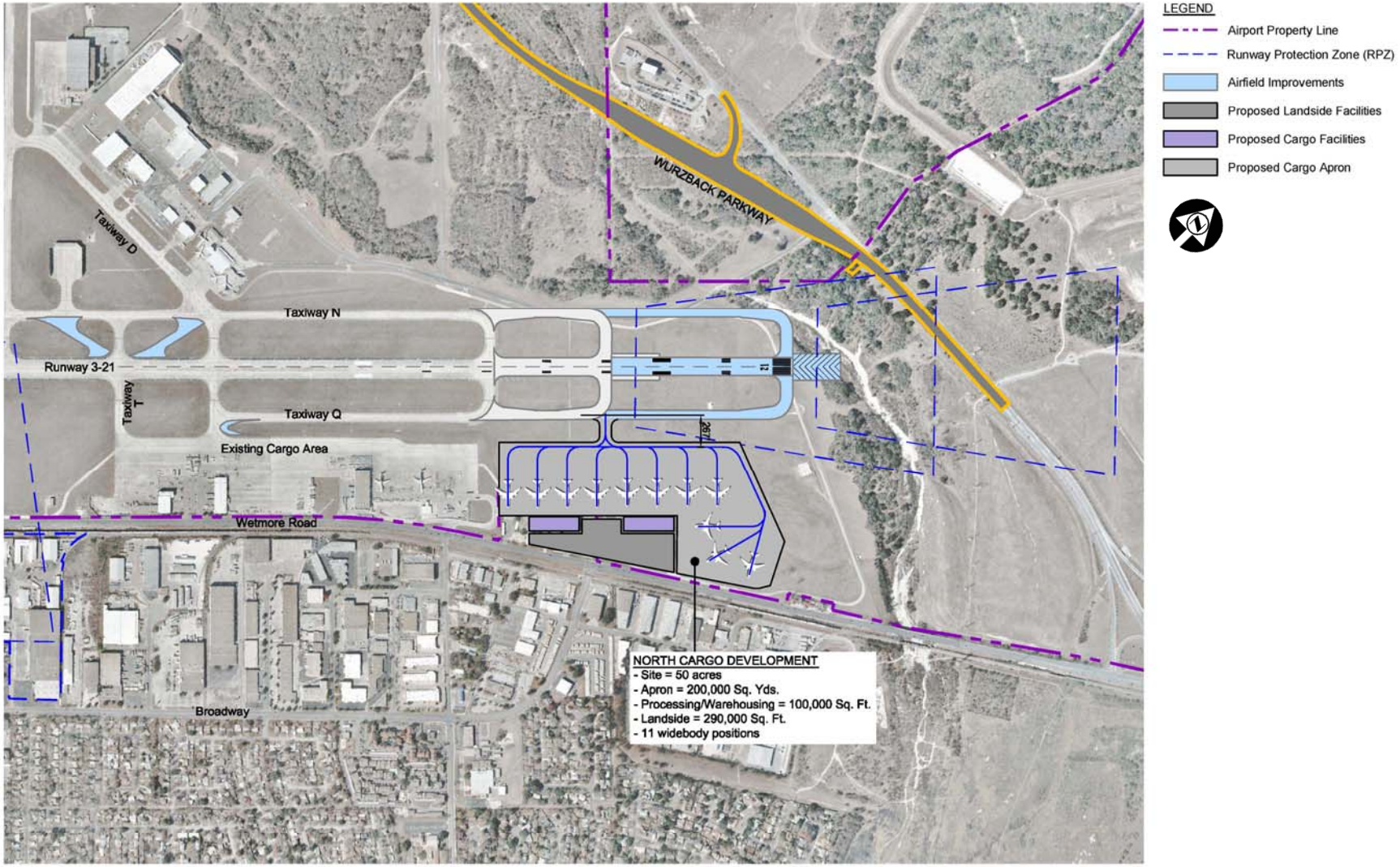
Figure 5-53: Cargo Development Alternative 4



5.6.4 Recommendation

Cargo Development Alternative 3, depicted on Figure 5-52, is the preferred development plan because it would meet immediate needs, avoid environmental issues, and result in a logical ultimate buildout of cargo facilities at SAT. Recommendations are as follows:

- All available land north and south of the existing cargo complex should be reserved for future cargo development. An additional 6 to 7 acres adjacent to the Green Light site is available for expansion to the north beyond the planning period.
- Development during the planning period should avoid sites requiring environmental cleanup. Several recent studies and conversations with Airport management and staff have revealed that the Green Light site and on-Airport land immediately west of this site are contaminated and would require extensive environmental cleanup before development could be initiated. Because of the environmental concerns, it is recommended that the City proceed very cautiously with any property acquisition involving this site.
- The apron expansion to the north would not be contiguous with the existing apron because of the grade elevation change. The Taxiway Q extension would slope down toward the north end of the Airport to provide airfield access to the new cargo apron. The entire north cargo apron should be constructed in one phase to minimize the effects of construction in the AOA.
- All general aviation overflow parking should be moved away from the cargo complex to maximize the use of existing cargo facilities.
- Facilities should be designed to meet ADG V standards. Currently, the separation between Taxiway Q and the adjacent cargo taxilane is 205 feet, which does not meet the separation requirements for simultaneous ADG V aircraft movements. However, in the planned north cargo expansion, taxilane extensions are designed to accommodate ADG V aircraft.

In the north cargo area, the first widebody position east of the new cargo apron taxilane would have a minor tail penetration of FAR Part 77 transitional surfaces. The site facilities in the preferred alternative were arranged to maximize the site potential and limit FAR Part 77 tail penetrations.

Ultimately, future cargo tenants will determine the exact layout that would function best with their operations, and easily integrate into the overall Airport plan.

5.7 GENERAL AVIATION DEVELOPMENT ALTERNATIVES

Site locations considered and the recommended plan for developing the Airport's general aviation facilities throughout the planning period are discussed in this section.

5.7.1 Background

The Airport has privately owned GA facilities and six FBOs. Collectively, 145,000 square yards of aircraft parking apron and over 660,000 square feet of aircraft storage facilities are available for general aviation customers. **Table 5-6** presents the projected GA facility requirements throughout the planning period.

Table 5-6: General Aviation Facility Requirements

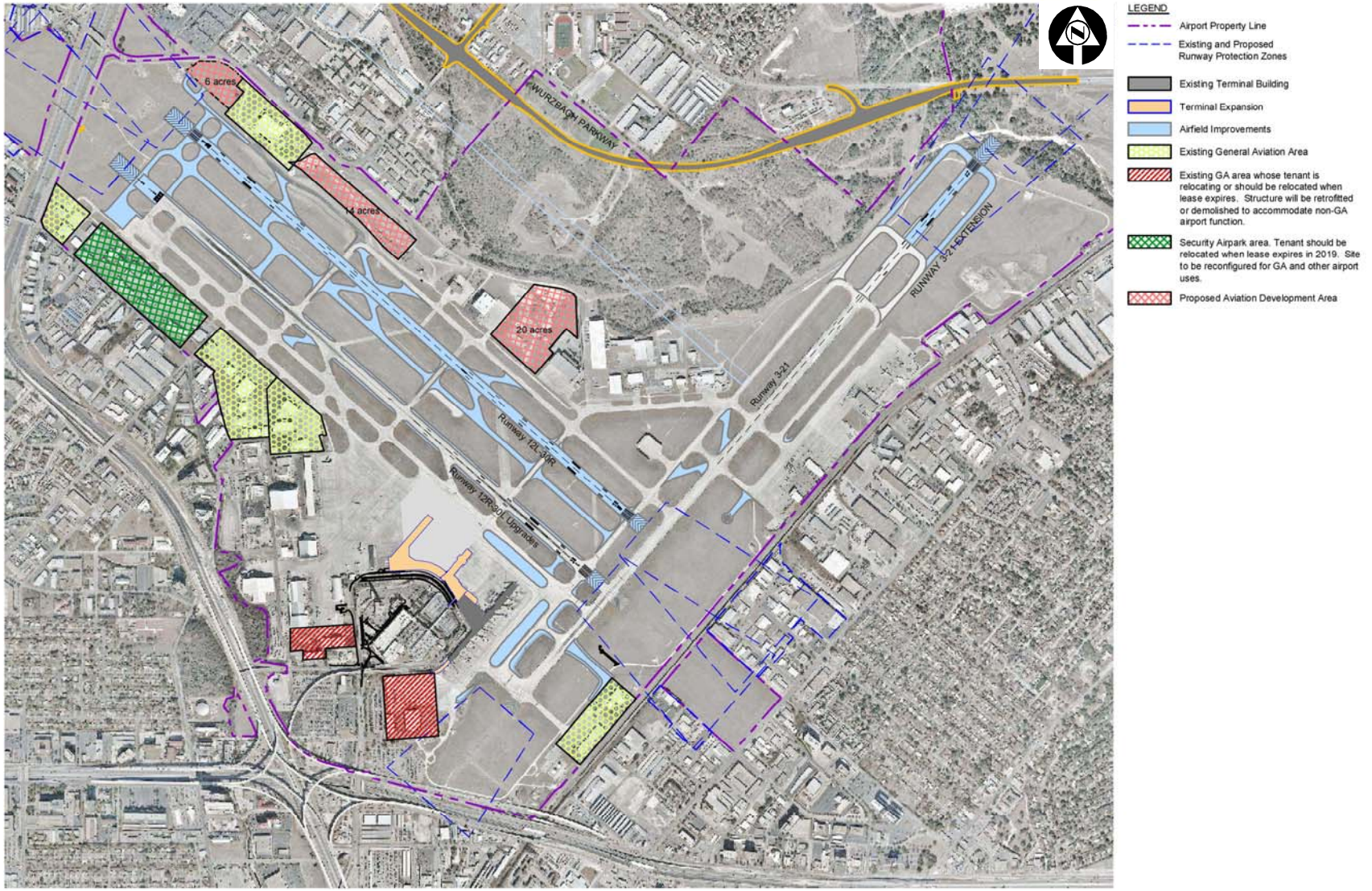
	Existing	Projected Requirements				
		2008	2010	2015	2020	2030
Aircraft Parking Apron (square yards)						
Based aircraft parking apron	21,020	13,200	13,800	15,500	13,600	13,000
Itinerant aircraft parking apron	124,030	312,600	272,900	289,900	295,600	304,100
Total aircraft parking apron	145,050	325,800	286,700	305,400	309,200	317,100
Aircraft Storage Facilities (square feet)						
Conventional hangar space	617,530	247,300	263,000	360,200	486,400	627,800
T-hangar space	49,620	111,100	115,900	130,500	114,100	109,600
Total aircraft storage	667,150	358,400	378,900	490,700	600,500	737,400

The City of San Antonio has made a policy decision not to provide additional T-hangar space at SAT. Therefore, no space was allocated for this use.

5.7.2 Site Selection

Existing GA facilities are scattered throughout the Airport. Ideally, GA facilities would be consolidated in one location, similar to air cargo facilities. Given the land constraints at SAT, a consolidated GA concept is not feasible without significant land acquisition. However, the north side of the Airport has been identified as available land that would accommodate GA demand. GA facilities should be consolidated as much as possible on the identified north site by moving the facilities away from areas for which the highest and best use is not general aviation, such as the passenger terminal area. The potential GA development areas are illustrated on **Figure 5-54**. It should be noted that the north side parcels are designated as parcels for aviation development, which includes general aviation, Airport support, and MRO facilities. The actual use of each parcel will be determined based on tenant demand and the specific characteristics of each parcel, (i.e., size, location, and environmental conditions).

Figure 5-54: 2030 Commercial Aviation Development Areas



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Advantages of the north side location are:

- This area of the Airport is separate from the passenger terminal area.
- The area has good landside access via Entrance Road from the east and Nakoma Drive from the west. Both roads provide relatively easy access to U.S. 281. Access will improve after the construction of Wurzbach Parkway is completed.
- Airfield access from this side of the Airport is adequate. Most parcels are directly adjacent to Runway 12L-30R. This runway is to be upgraded and extended and will be able to accommodate all aircraft in the GA fleet mix.

The limited disadvantages of the north side location are:

- Because of the Airport property boundary and environmentally sensitive sites to the north, the potential sites have limited depth and would require significant environmental cleanup before development could be initiated.
- While the potential sites would be sufficient to accommodate projected 2030 requirements, development opportunities beyond the planning period may be limited.

It should be noted that the City of San Antonio has a policy of not accommodating all demand for T-hangar space at SAT and to encourage the use of reliever airports to preserve capacity at SAT for larger aircraft. Given land constraints and the need to allocate land for other aviation activities with higher priority, T-hangars are not the highest and best use of land at SAT. Stinson Municipal Airport is more suitable for smaller GA activity.

5.7.3 Recommendation

Given the constraints of the Airport site and the advantages of the potential north side site locations, it is recommended that the vacant parcels north of the airfield, parcels adjacent to the H-E-B and Valero hangars and between the Cessna Corporation facilities and the ARFF station, be used for general aviation, concurrently with other aviation development, such as Airport support and MRO facilities. The existing GA facilities located in the terminal area—Nayak Aviation and corporate hangars for Silver Ventures, Tesoro, and Stargazer—should be relocated to the north side when their leases expire.

The lease for Security Airpark facilities, on the northwest side of the Airport, expires in 2019. It is recommended that the site be reconfigured when it becomes available. The parcel should be used for FBO facilities, including GA Customs and Immigration facilities, to prevent general aviation aircraft from using the FIS gates at the passenger terminal.

5.8 AIRLINE AND AIRPORT SUPPORT ALTERNATIVES

The development considered for key components of the Airport's airline and Airport support facilities, and recommendation for development throughout the planning period, are discussed in this section.

5.8.1 Airline Support

Ground Service Equipment Storage and Maintenance

Ground service equipment storage and maintenance facilities are currently located in the West Cargo Building. It was assumed that space required for tenant GSE storage and maintenance will increase as passenger demand increases. It was determined that an additional 11,000 square feet of building space will be required during the planning period.

The West Cargo Building is an ideal location for tenant GSE storage and maintenance as it is adjacent to the terminal complex in a consolidated facility. The preferred alternative would be to expand within the existing building. Property data gathered by the AECOM Team identified vacant bays within the building that could be used to accommodate additional GSE storage and maintenance. Prior to expansion into the West Cargo Building for GSE storage and maintenance, it would be necessary to rehabilitate the building and bring it up to current codes and standards, as outlined in the *Building Evaluation Report* completed by Tetra Tech in January 2009.

However, if it is infeasible to accommodate the GSE for all airlines in this facility throughout the planning period, Building 1316 (formerly leased by Landmark Aviation) was identified as a viable alternative for tenant GSE storage and maintenance. Currently, Building 1316 is not occupied, and could be renovated or demolished and rebuilt to accommodate the required GSE storage and maintenance functions. The building has approximately 40,000 square feet, which would allow for expansion beyond the planning period. The location of the building would not conflict with the recommended long-term terminal expansion plan.

Airline Catering and Flight Kitchen

The airline catering and flight kitchen is not currently operating at capacity. Additionally, the building could accommodate future expansion and is located off-Airport property. Therefore, it is not expected that Airport land would need to be reserved for this use.

General Aviation Fuel Storage

Several FBOs store and provide their own jet fuel. It is not expected that general aviation fuel storage facilities will need to be expanded during the planning period. However, individual operators may choose to expand their own fuel storage facilities.

Air Carrier Fuel Farm

Jet fuel for the commercial passenger and all-cargo airlines is stored in two tanks at the southeast end of the Airport adjacent to the Runway 3 endpoint and Wetmore Road.

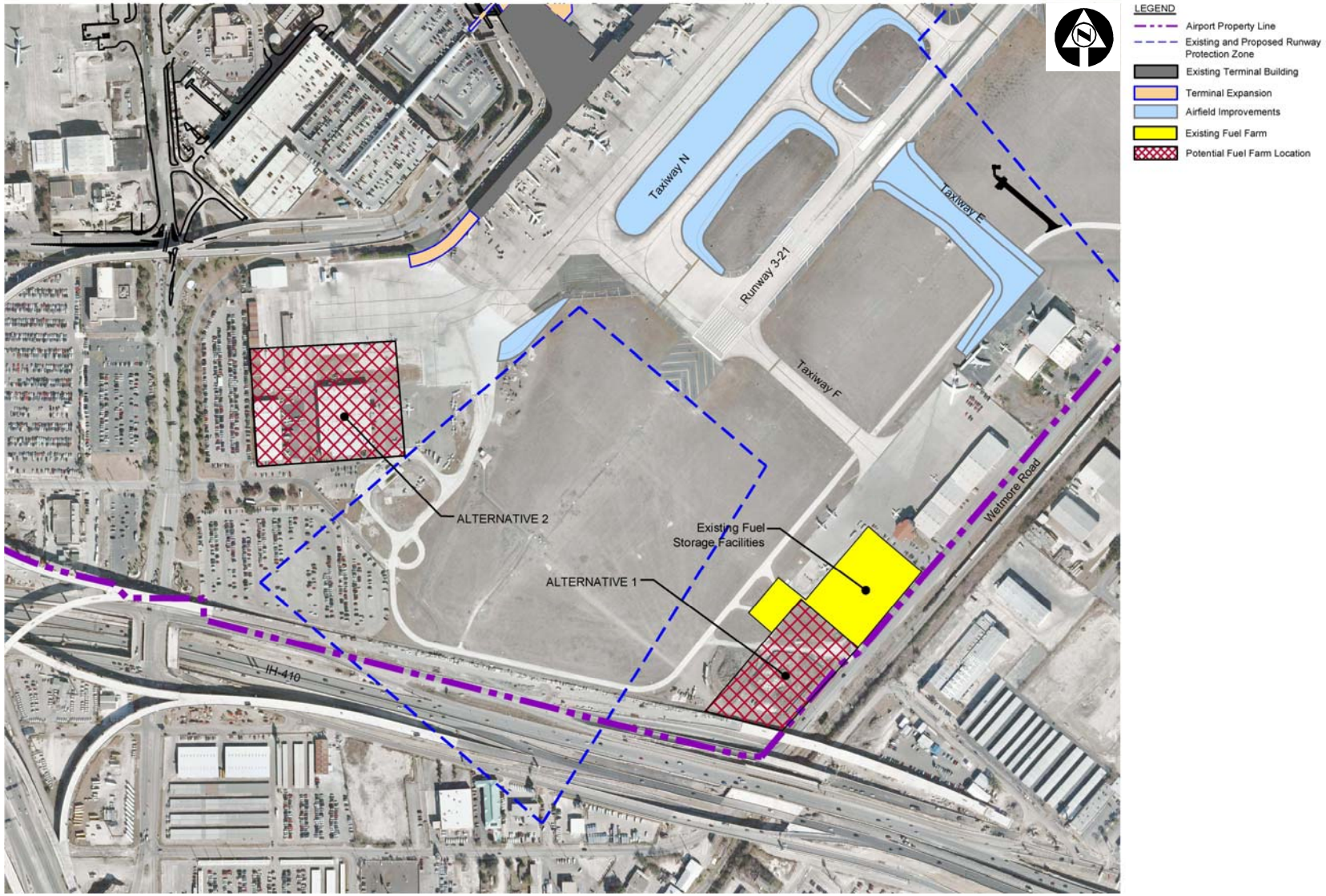
It is recommended that the City preserve land sufficient to store a 7-day fuel reserve. This reserve amount is consistent with historical operating practice at the Airport. Fuel storage requirements are projected to increase from 840,000 gallons today to 1.3 million gallons in 2030, and the area to be reserved for the fuel farm is projected to increase from 2.7 acres to 4.4 acres.

The Airport does not have a hydrant fueling system; therefore, fuel trucks distribute jet fuel from the fuel farm to aircraft at the gates. The current and forecast activity levels would not justify the cost of constructing a fuel hydrant system. Therefore, the ideal location for a fuel farm is near the terminal area, but isolated from heavily trafficked areas. Two alternative locations, as shown on **Figure 5-55,** were evaluated. Under Alternative 1, the existing fuel farm would be expanded to the south. Under Alternative 2, the fuel farm would be relocated to the other side of Runway 3-21 on the site currently occupied by Nayak Aviation, and would, therefore, require the demolition of Buildings 1425 and 1426.

It is recommended that the fuel farm remain in its existing location and be expanded to the south as depicted in Alternative 1 for the following reasons:

- The high cost to relocate a fuel farm is unfavorable.
- The highest and best use for the Alternative 2 site is for RON aircraft parking positions.

Figure 5-55: Potential Fuel Farm Locations



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5.8.2 Airport Support

Aircraft Rescue and Fire Fighting Facilities

The Airport's ARFF station is adequately sized to handle the expected demand and fleet mix serving the Airport throughout the planning period. Some renovations and expansion of the existing facility are planned, but it is not anticipated that more land will be required.

An analysis, presented in **Appendix E**, was prepared to determine if more than one ARFF station will be needed when the airfield is expanded. Specifically, the time required to reach the midpoint of the runways was analyzed to ensure that the existing ARFF station location meets the required FAR Part 139 response time to the runways following their extensions in accordance with Master Plan recommendations. From the analysis, it was concluded that the existing station would meet the requirements and, therefore, that it is adequately located and no secondary station is required.

It is recommended that the ARFF training fuselages, located immediately west of the station, be relocated to free this area for aviation development.

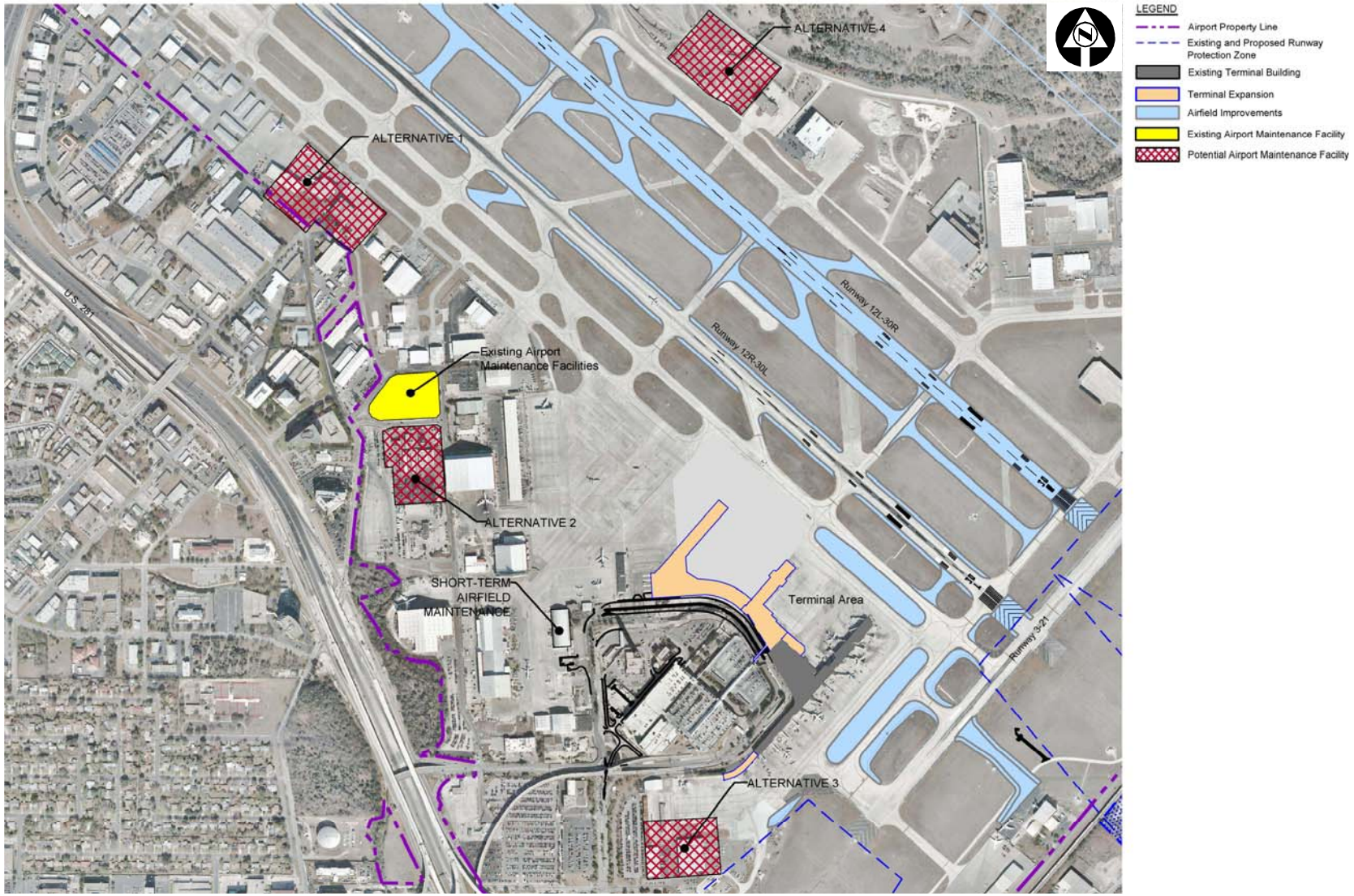
Airport Maintenance Facilities

Airport maintenance facilities are located in the western portion of the Airport at the intersection of John Saunders Road and Paul Wilkins Road. The current 4.7-acre site is undersized and an additional 5 acres are required to meet immediate needs. Ideally, Airport maintenance facilities would have airfield access, which is not the case with the current site.

Four alternatives, depicted on **Figure 5-56**, were identified as potential opportunities for expansion or relocation of the maintenance facilities. Under Alternative 1, the maintenance facilities would be relocated to a portion of the Security Airpark site, the lease for which expires in 2019. The site would meet the space requirements for Airport maintenance facilities and would have good airfield access. Under Alternative 2, the existing facilities would be expanded onto the Hertz rental car site directly south of the existing maintenance facilities. The parcel is approximately 7 acres, would allow for expansion of the existing site, and would provide airfield access. However, it would also require relocation of the Hertz operation. Under Alternative 3, the maintenance facilities would be relocated to the current Nayak site at the south end of Terminal A. Depending on the development layout, this area is approximately 10 acres, with good airfield access. Under Alternative 4, the maintenance facilities would be relocated on the north side of the Airport, immediately west of the ARFF station. This site has very good airfield access, being adjacent to Taxiway RC. The site has environmental issues that would make it difficult to develop for revenue-producing uses. All alternatives would accommodate 2030 requirements for Airport maintenance facilities.

Alternative 4 is recommended, as it would accommodate the space requirements for maintenance facilities, provide airfield access, and make use of a site that cannot be developed for general aviation or other commercial uses because of environmental constraints.

Figure 5-56: Potential Airport Maintenance Facility Locations



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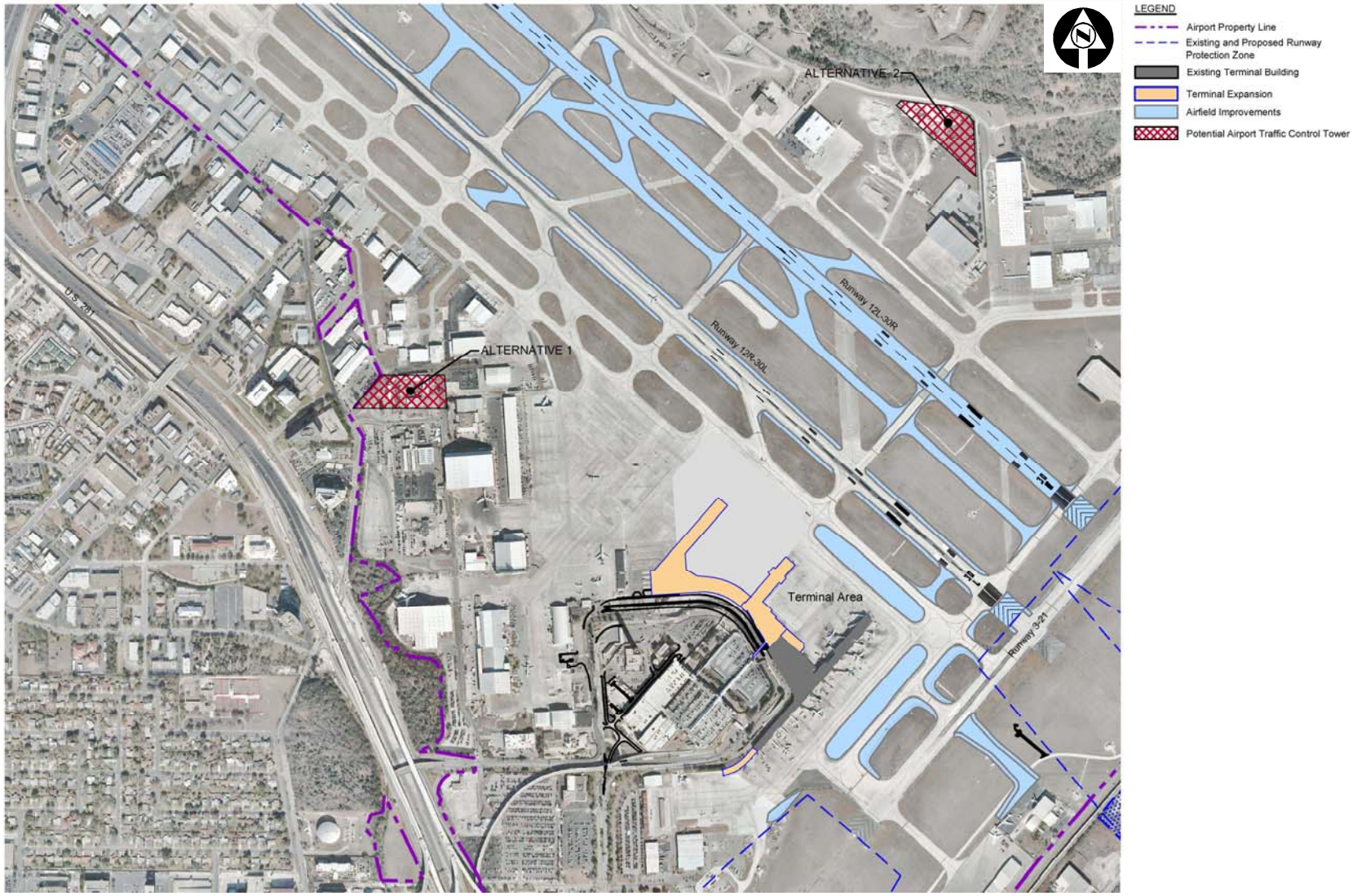
FAA Facilities

All existing FAA facilities at SAT are sized correctly, and located on an adequate site to meet FAA standards. No change to the facilities is required during the planning period. However, the current location of the ATCT is not ideal because of its proximity to the terminal complex. Generally, the FAA prefers the ATCT to be away from public areas, such as a terminal. As the Airport grows, the existing ATCT site would be ideal for the expansion of landside functions. As airfield projects are implemented, ATCT line of sight considerations should be evaluated to meet FAA criteria. The ATCT was constructed in 1986, and is assumed to exceed its useful life during the planning period. Given these issues, the City may consider relocating the ATCT to a new site toward the end of the planning period.

Two alternative locations were identified for a new ATCT, as shown on **Figure 5-57**. Alternative 1 is in the location of the existing Airport maintenance facilities. Once the maintenance facilities are relocated, as recommended in the short-term implementation phase, this site would be available for ATCT development. A second site, Alternative 2, is located on the northern side of the airfield in an area suggested for potential commercial development. Alternative 1 is the preferred development location for the ATCT, as Alternative 2 could be affected by construction of a third parallel runway, anticipated for implementation beyond the planning period.

When considering construction of a new ATCT, the City should evaluate safety (distance from the passenger terminal or other public areas), height restrictions resulting from surrounding aeronautical surfaces, FAA ATCT required siting criteria, and cost/constructibility. A detailed study should be conducted to evaluate all possible site locations for a new ATCT.

Figure 5-57: Potential Airport Traffic Control Tower Locations



Airport Administrative Facilities

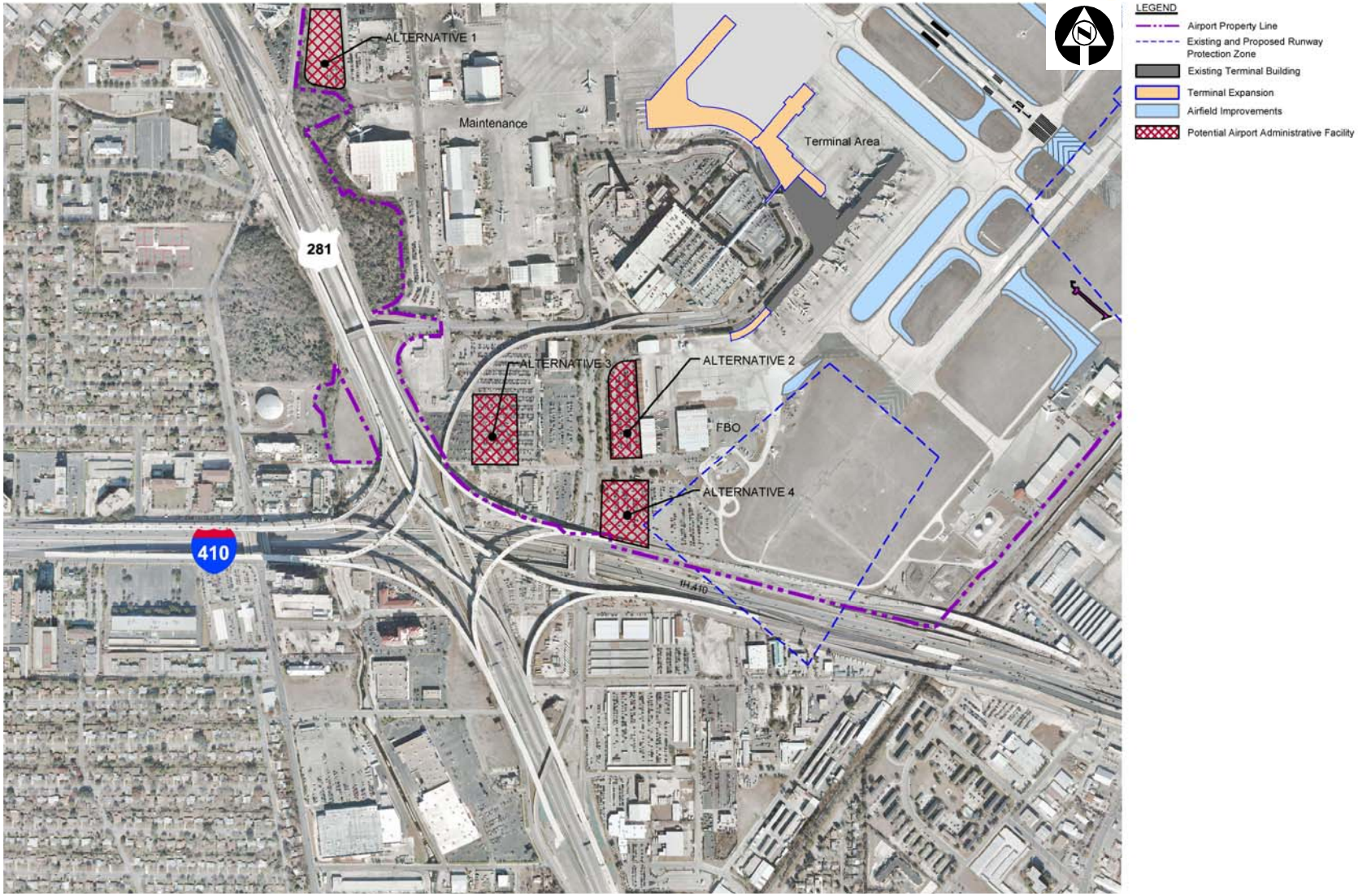
In a 2008 study, DHR Architects determined the space requirements for a consolidated facility for Airport administrative functions. It was confirmed by Airport staff that the requirements are unchanged. The study recommendation was to build a three to four story building with a total surface of 77,000 square feet to accommodate staff who need to be in direct terminal proximity and staff who need to be located close to the terminal. Parking should also be provided. DHR Architects estimated the need for 200 parking spaces, which translates to a 1.5-acre surface parking lot, including circulation space. The total parcel size – including building, parking, circulation, and landscaping – is estimated at 3.0 acres.

Several potential sites, shown on **Figure 5-58,** were evaluated.

- Under Alternative 1, the facilities would be located on a site currently used for rental car storage and that could be made available when the rental car companies relocate to a consolidated facility. However, the Alternative 1 site is located farther from the terminal area than the other site alternatives, which is not optimal for staff who need rapid access to the terminal buildings, and the area is adequately located for expansion of the SAA facilities.
- The Alternative 2 site is in close proximity to the terminal area and has good landside access via Northern Boulevard and Airport Boulevard. The site is currently used for employee parking.
- The Alternative 3 site is in close proximity to the terminal area and has good landside access via Northern Boulevard and Airport Boulevard, but is currently used for economy parking. Construction of Airport administrative facilities on the site would necessitate relocation of a portion of this parking lot.
- The Alternative 4 site is in close proximity to the terminal area and has good landside access via Northern Boulevard and Airport Boulevard. The site is currently used for employee parking.

Alternative 2 is the preferred alternative because of its proximity to the terminal area and direct airfield access.

Figure 5-58: Potential Locations for Airport Administrative Facilities



Centralized Concessions Receiving/Distribution Center

There are three basic airport receiving and distribution center scenarios: (1) individual deliveries directly to the terminal with individual package screening at the terminal; (2) centralized screening and deliveries with no central storage; and (3) centralized screening and deliveries with central storage. Currently, the Airport operates under the first scenario. The Aviation Department wishes to explore site locations for a remote centralized concessions receiving/distribution center. When developing a site for a remote centralized facility, the following functions must be considered:

- Landside access
- Receiving dock
- Storage
- Screening
- Distribution

Landside access to the facility should be designed to accommodate all concessions delivery trucks serving the Airport. Access roads from the highway or other major roads to the site should be considered. As much as possible, access to the facility should be designed to separate delivery trucks from the typical passenger terminal traffic flow. At the facility, adequate truck maneuverability to and from the loading dock is essential. Additionally, it is recommended that additional space for idle trucks waiting to offload at the receiving dock be provided to minimize congestion.

The number of required loading bays at a receiving dock is expressed as a unit per square feet of concession space. For airports with terminal concession space of 50,000 to 100,000 square feet, one bay is required for each 20,000 square feet of concession space or fraction thereof. It was assumed that the Airport will have approximately 63,000 square feet of concession space during the planning period based on the requirements presented in Chapter 4. Therefore, a minimum of four bays would be required. The receiving area is sized to accommodate approximately 0.0006 square foot per annual enplaned passenger. For the planning period, that corresponds to approximately 4,100 square feet total.

Concession support space, such as storage space, accounts for approximately 20 percent of total concession space. In a remote facility scenario, it was assumed that 50 percent of the above stated percentage would be required for remote storage. Nonperishable products may be delivered once a week, and stored in the central facility. However, perishable items, such as milk or meat, would be immediately screened and transported to terminal storage. In the baseline scenario, which includes Terminals A and B, approximately 51,000 square feet of concession space would be available at SAT, 9,000 feet of which would be support space. By the end of the planning period, it is expected that 66,000 square feet of concession space will be required at SAT. Therefore, the required area for concession storage would be an estimated 14,000 square feet, half for the terminal and half for remote storage. In addition to the required concession storage space, other Airport users and the Aviation Department itself are expected to require space within the facility. For purposes of this Master Plan, it was assumed that an additional 2,500 square feet of space would be required to accommodate the Aviation Department and the airlines. A planning factor of 20 percent was assumed for circulation.

Retail goods may be subject to X-ray screening before they are accepted for storage. The equipment used must be of a type approved by the Department of Homeland Security and must

be installed in accordance with the applicable regulations, including provisions for adequate space. To accommodate the sizes of all products, it is recommended that oversized X-ray machines be used. In addition, it is recommended that more than one machine be used for redundancy and to accommodate peak hour volumes. It was assumed that 2,500 square feet would be required for each screening point.

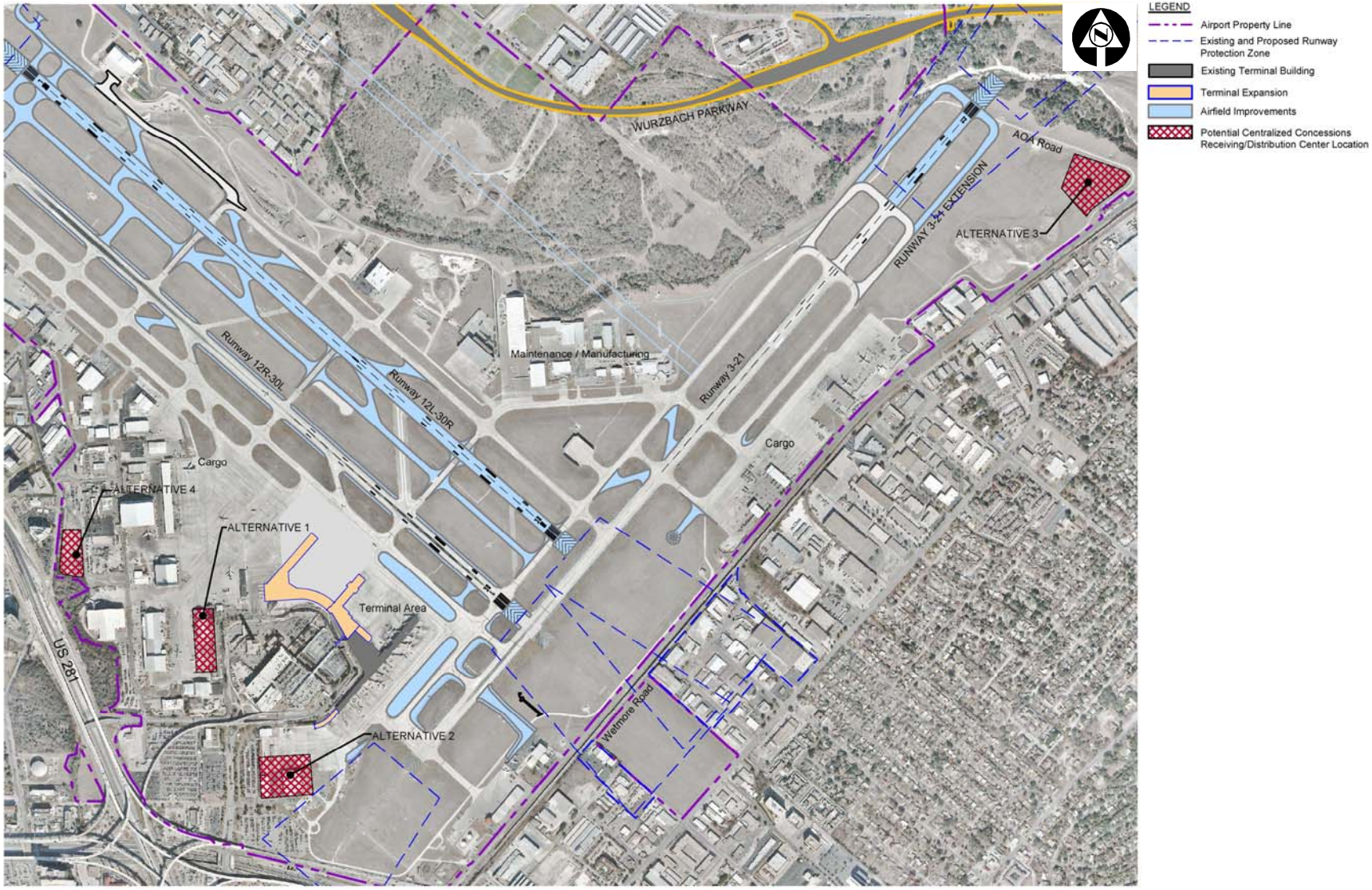
Once the items have been screened, they are loaded onto vehicles for distribution to the terminal. These vehicles are smaller than the trucks that delivered the goods and, therefore, the loading area would be smaller than traditional loading docks. A 1,000-square-foot loading area was assumed to be adequate.

Based on the required square footage of each element listed above, the approximate required size of the centralized receiving and distribution center would be 23,500 square feet. For planning purposes, the design should be able to accommodate the largest delivery truck. It was assumed that required landside area would be approximately 1.0 acre. The approximate total area required to accommodate all functions would be 2.0 acres. If the City proceeds with a centralized facility, detailed programs for all functions should be prepared, and current security screening measures should be reviewed.

Four alternatives were evaluated for the siting of a centralized facility, as illustrated on **Figure 5-59** and described below.

- Under Alternative 1, Building 1316 and the surrounding area would be redeveloped. The site is in close proximity to the terminal, but all trucks would have to access the facility via the terminal roadway, which would cause unnecessary congestion in the terminal area.
- The Alternative 2 site is on the existing employee parking lot. The distance is marginally farther from the terminal, but is completely separate from the main terminal traffic flow. However, because of the excellent airfield location, it was determined that this site should be used for other higher value land uses, such as RON aircraft positions.
- The Alternative 3 site is in the northeast corner of Airport property adjacent to the proposed cargo development and Wetmore Road. The site is completely separate from terminal activity, and could lead to increased susceptibility to spoilage.
- The Alternative 4 site is in the west corner of the Airport adjacent to the existing Airport maintenance facilities. The site is currently occupied by Hertz facilities, which would be relocated to the CONRAC. The site is in close proximity to the terminal area, and truck traffic would be separate from passenger traffic flows. The site would also accommodate the space requirements described above. Therefore, Alternative 4 is the preferred alternative.

Figure 5-59: Potential Centralized Concessions Receiving/Distribution Center Locations



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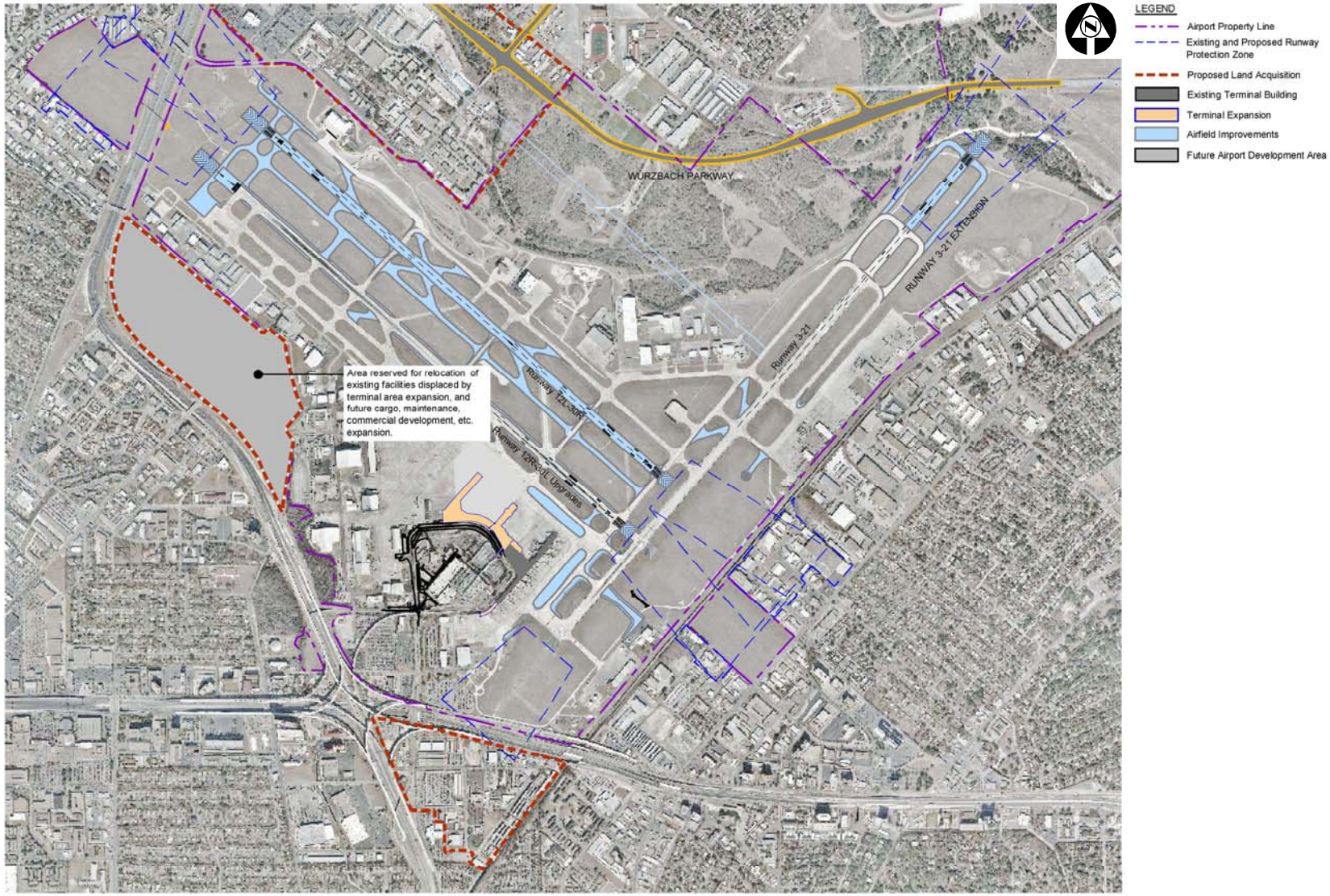
5.9 AIRCRAFT MAINTENANCE AND MANUFACTURING FACILITIES DEVELOPMENT ALTERNATIVES

The recommended plan for expanding the Airport's aircraft maintenance and manufacturing facilities throughout the 2030 planning period is discussed in this section.

Aircraft maintenance and manufacuturing facilities are located on the west and north sides of the Airport. The SAA maintenance complex is adjacent to the terminal apron area. Cessna Corporation is located on the north side adjacent to the ARFF station. The north complex is north of the airfield, adjacent to the engine runup apron.

The requirements for the maintenance and manufacuturing facilities are driven by specific tenants. When demand warrants growth, these facilities can be expanded adjacent to their existing facilities. It is recommended that the parcels designated as "commercial aviation" on Figure 5-56, be used for expansion of the existing MRO and aircraft manufacturing facilities. Because of the site constraints, it is not likely to be feasible for a new entrant to develop a large scale facility unless the City acquires land. It is proposed that the City acquire the property west of the Airport adjacent to U.S. 281, as shown on **Figure 5-60**. Such acquisition would allow for expansion of Airport facilities, including aircraft maintenance and/or manufacturing facilities.

Figure 5-60: Potential Long-term Property Acquisition



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5.10 PREFERRED DEVELOPMENT PLAN

The preferred development plan is a comprehensive aggregation of the preferred development alternatives described in this Master Plan. The recommended Airport improvements are essential to help mitigate operational inefficiencies and to maintain levels of service that are acceptable to the City and Airport tenants. As shown throughout this Master Plan, the AECOM Team has identified several short- and long-term development needs that should be addressed by the City. Several alternatives were developed, reviewed, and evaluated to determine the most beneficial alternative for each affected area. The following summarizes each development area and the recommended alternative for implementation. A depiction of the preferred development plan is shown on **Figure 5-61**.

Airfield

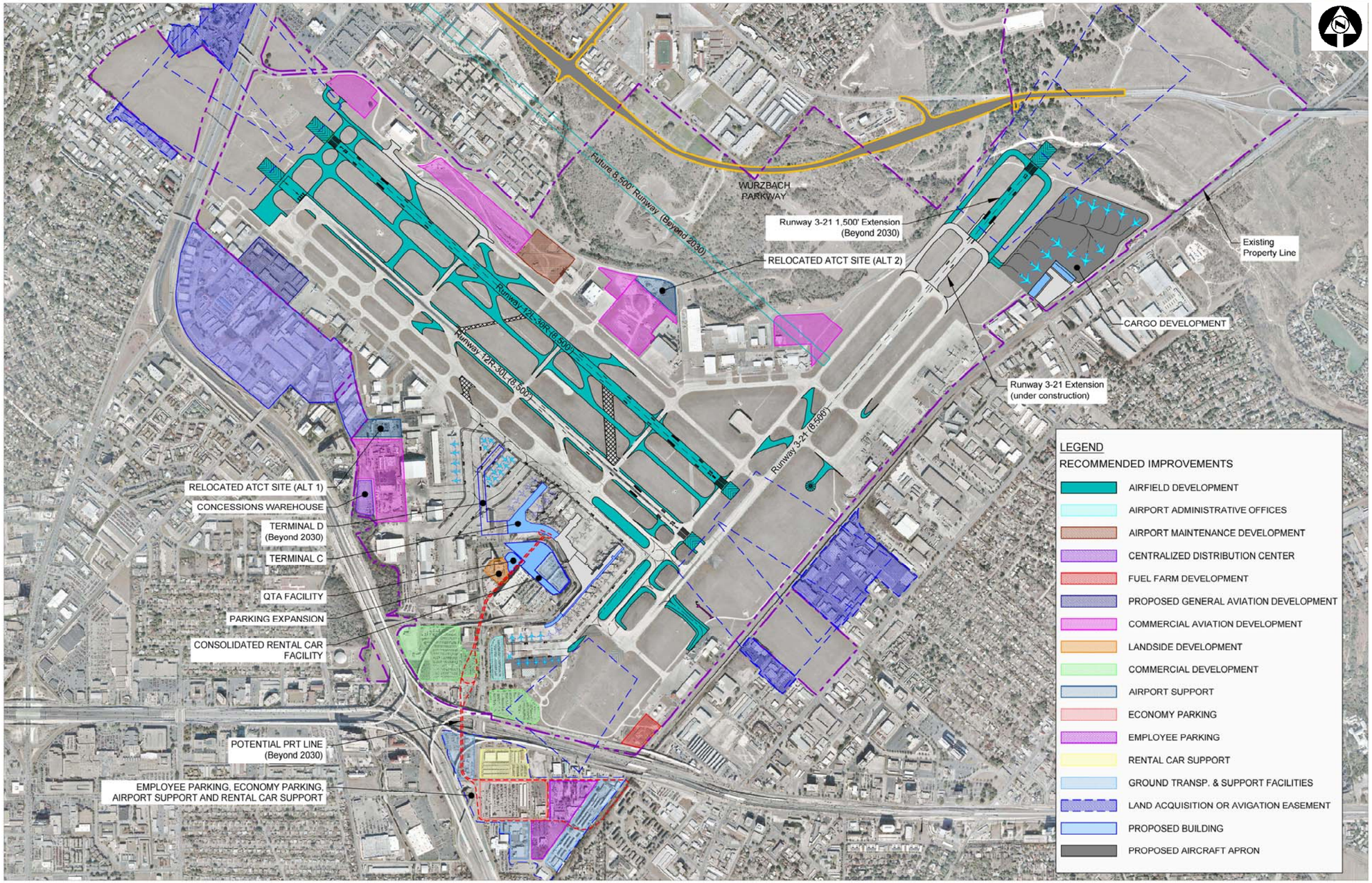
Under the preferred airfield alternative, Runway 3-21 would be extended 1,500 feet northeast for a total length of 10,000 feet. All runway safety areas would remain within Airport property so there would be no impacts to adjacent roadways or properties. Additionally, all proposed FAR Part 77 imaginary surfaces would remain free of objects. However, it should be noted that the extension of Runway 3-21 does present a design challenge. There is a considerable elevation change from the end of the existing runway to the end of the extended runway (an approximate 20-foot decline).

Under the preferred airfield alternative, Runway 12L-30R would be upgraded to accommodate commercial air carrier aircraft operations. The runway would be reconstructed to 8,500 feet long and 150 feet wide, and the runway centerline would be shifted approximately 10 feet north. Doing so would provide 1,000 feet of separation to the Runway 12R-30L centerline. It should be noted that the proposed RPZs at both ends of the runway would affect off-Airport industrial properties.

Runways 12R-30L and 3-21 would be decoupled by displacing the Runway 30L end by 450 feet to eliminate the intersection with Runway 3-21. Runway 12R-30L would be extended 450 feet to the north to provide 8,500 feet of runway length. Additionally, Taxiway N would be widened on the southwest side of the new Runway 30L threshold to improve aircraft maneuverability in the vicinity. A full-length parallel taxiway would be constructed between Runways 12L-30R and 12R-30L to provide more efficient aircraft traffic flow. During this process, Taxiways P and M would be demolished.

Two grass areas northeast and southeast of the terminal area would be infilled with full-strength pavement to accommodate shifted Taxiways H and N, along with the terminal area taxilanes, to provide better maneuvering for ADG IV aircraft.

Figure 5-61: Preferred Development Plan



Terminal

Several key passenger processing functions in Terminal A have been identified as requiring short-term terminal improvements to significantly increase the level of service provided at the Airport. The improvements focus primarily on providing additional space for the passenger security screening checkpoint and the baggage claim area, and reducing the underutilized CBP. As originally proposed in Chapter 4, two additional contact gates would to be added to accommodate short-term gate demand. One gate was intended to be added on Terminal A and one gate would be added on Terminal B. However, a detailed analysis of the proposed gate expansion in this chapter determined that Terminal B could not accommodate an additional gate without significantly impacting an adjacent taxilane. Therefore, the two-gate expansion is proposed on the south end of Terminal A. The new gate layout required revisions to the airline gate assignments and the passenger activity levels for all of the Terminals which, in turn, revised the facility requirements for each terminal from what is shown in the Demand/Capacity and Facility Requirements chapter. The updated facility requirements tables for Terminals A, B, and C are shown in **Tables 5-7**, **5-8**, and **5-9**, respectively.

Other recommended short-term improvements include in-filling several open notches along the concourse for other support functions such as holdrooms, concessions, and airline operations. Futhermore, Terminal A will be expanded by 30 feet on the east side of the north concourse and 20 feet on the east side of the south concourse to be consistent with current industry standards.

The long-term terminal development focused primarily on the 2030 planning period; however, additional analysis was done to ensure that the recommended terminal layout for 2030 could be expanded to meet 2050 demand on the existing terminal site. The recommended long-term terminal alternative exceeds the forecast gate demand, provides efficient airfield movement capabilities, and creates a sense of one unified terminal area. The proposed terminal layout locates Terminal C landside parallel to the existing roadway and with a concourse pier which extends parallel to the concourse piers of Terminals A and B. Doing so creates a symmetrical apron area between Terminals B and C which minimizes problematic apron layouts and ensures future apron flexibility. Terminals B and C are connected by a 120-foot wide corridor which provides generous secure and non-secure space for passenger flows throughout the entire terminal area. Specific focus has been given to increase the amount of secure and non-secure concessions at the Airport. Adequate concession spaces have been identified throughout Terminal C and the terminal connector.

The 2030 RON aircraft demand has been accommodated within the existing West RON Apron, the South RON Apron, and the Nayak Aviation FBO area. The existing Nayak Aviation FBO must be demolished and relocated to accommodate independent aircraft operations between all RON aircraft. An alternate site for Nayak Aviation is discussed in the GA section below.

Table 5-7: Terminal A – Revised Facility Requirements
Domestic and International Airlines

	Terminal A	Forecast Demand			
AIRLINE PROCESSOR AREAS	**Baseline**	**2010**	**2015**	**2020**	**2030**
Agent Positions (number)	58	32	37	44	42
Ticket Counter Length (linear feet)	322	160	185	220	210
Ticket Counter Area (square feet)	3,376	1,600	1,850	2,200	2,100
ATO Offices (square feet)	14,520	7,635	8,824	10,640	10,144
Airline Operations Space (square feet)	18,239	17,739	22,458	27,391	28,568
Baggage Makeup Area (square feet)	15,900	16,035	19,153	23,693	25,360
Airline Clubs (square feet)	-	4,772	5,515	6,650	6,340
Subtotal (square feet)	52,035	47,780	57,799	70,574	72,512
AIRCRAFT GATES		**2010**	**2015**	**2020**	**2030**
Widebody Aircraft (number)	-	-	-	-	-
Large Narrowbody Aircraft (number)	-	-	-	-	-
Narrowbody Aircraft (number)	16.0	16.0	16.0	18.0	18.0
Subtotal (number)	16.0	16.0	16.0	18.0	18.0
Equivalent Aircraft (EQA) Index	22.4	22.4	22.4	25.2	25.2
HOLDROOMS		**2010**	**2015**	**2020**	**2030**
Widebody Aircraft (square feet)	-	-	-	-	-
Large Narrowbody Aircraft (square feet)	-	-	-	-	-
Narrowbody Aircraft (square feet)	32,314	32,000	32,000	36,000	36,000
Subtotal (square feet)	32,314	32,000	32,000	36,000	36,000
BAGGAGE CLAIM		**2010**	**2015**	**2020**	**2030**
Claim Frontage (linear feet)	784	856	968	1,153	899
Claim Units[1] (number)	5	6	6	8	6
Claim Area (square feet)	12,627	21,411	24,198	28,820	22,480
Baggage Service Offices (square feet)	1,668	1,606	1,815	2,161	1,686
Inbound Bag Area (square feet)	11,141	12,846	14,519	17,292	13,488
Subtotal (square feet)	25,436	35,863	40,532	48,273	37,654
CBP		**2010**	**2015**	**2020**	**2030**
Customs and Border Protection (FIS) (square feet)	26,426	24,334	25,512	28,160	-
Subtotal (square feet)	26,426	24,334	25,512	28,160	-
PUBLIC SPACE		**2010**	**2015**	**2020**	**2030**
Ticket Lobby (includes queuing) (square feet)	16,605	11,453	13,236	15,960	15,216
Meeter/Greeter Lobby (square feet)	1,760	3,548	4,100	4,944	4,714
Restrooms - Terminal Area (square feet)	2,702	3,991	4,613	5,562	5,303
Restrooms - Concourse Area (square feet)	5,675	4,772	5,515	6,650	6,340
Secure Circulation (square feet)	29,510	24,000	24,000	27,000	27,000
Sterile Circulation (square feet)	4,498	7,756	8,132	8,976	-
Other Public Circulation (square feet)	23,681	16,656	17,879	20,728	17,572
Miscellaneous (square feet).	-	2,000	2,050	2,101	2,154
Subtotal (square feet)	84,431	74,177	79,525	91,921	78,298
CONCESSIONS		**2010**	**2015**	**2020**	**2030**
Ground Transportation Services (square feet)	1,687	642	726	865	674
Concessions: Non-Secure (square feet)	4,594	4,772	5,515	6,650	6,340
Concessions: Secure (square feet)	19,739	21,832	27,640	33,712	35,160
Loading Dock (square feet)	365	365	365	365	365
Concessions Support (square feet)	4,423	5,321	6,631	8,072	8,300
Subtotal (square feet)	30,808	32,932	40,877	49,664	50,839
SECURITY		**2010**	**2015**	**2020**	**2030**
Passenger Screening Lanes (number)	6	6	7	8	8
Passenger Screening Lane Space (square feet)	6,400	9,000	10,500	12,000	12,000
Baggage Screening Space (square feet)	20,700	10,000	10,000	12,500	12,500
Baggage Screening Equipment (EDS)	5	4	4	5	5
Subtotal (square feet)	27,100	19,000	20,500	24,500	24,500
OTHER		**2010**	**2015**	**2020**	**2030**
Non-Public Circulation (square feet)	15,384	16,922	18,615	20,476	22,524
Airport Maintenance (square feet)	-	2,000	2,200	2,420	2,662
Airport Administration (square feet)	22,811	25,092	27,601	30,361	33,398
TSA Administration (square feet)	977	1,075	1,182	1,300	1,430
Mechanical/Electrical/Utility (square feet)	42,568	46,825	51,507	56,658	62,324
Janitorial/Storage/Shops (square feet)	-	2,000	2,200	2,420	2,662
Non-Airline Tenant (square feet)	-	-	-	-	-
Unidentified Areas (square feet)	10,642	-	-	-	-
Structure/non-net areas (square feet)	6,695	7,365	8,101	8,911	9,802
Subtotal (square feet)	99,077	101,279	111,406	122,547	134,802
Total Square Footage	**377,627**	**367,365**	**408,152**	**471,639**	**434,605**
Total Square Footage (Rounded)	**378,000**	**367,000**	**408,000**	**472,000**	**435,000**

[1] Two baggage claim units are located within the FIS and unavailable for domestic use.

Table 5-8: Terminal B – Revised Facility Requirements

	Terminal B	Forecast Demand			
AIRLINE PROCESSOR AREAS	**Baseline**	**2010**	**2015**	**2020**	**2030**
Agent Positions (number)	26	12	13	12	18
Ticket Counter Length (linear feet)	107	60	65	60	90
Ticket Counter Area (square feet)	1,616	600	650	600	900
ATO Offices (square feet)	4,386	2,909	3,208	2,832	4,384
Airline Operations Space (square feet)	12,115	7,371	8,834	8,359	10,511
Baggage Makeup Area (square feet)	12,027	7,273	8,020	7,080	10,960
Airline Clubs (square feet)	2,510	1,818	2,005	1,770	2,740
Subtotal (square feet)	32,654	19,972	22,717	20,641	29,495
AIRCRAFT GATES		**2010**	**2015**	**2020**	**2030**
Widebody Aircraft (number)	-	-	-	-	-
Large Narrowbody Aircraft (number)	4.0	4.0	4.0	4.0	4.0
Narrowbody Aircraft (number)	4.0	4.0	4.0	4.0	4.0
Subtotal (number)	8.0	8.0	8.0	8.0	8.0
Equivalent Aircraft (EQA) Index	13.6	13.6	13.6	13.6	13.6
HOLDROOMS		**2010**	**2015**	**2020**	**2030**
Widebody Aircraft (square feet)	-	-	-	-	-
Large Narrowbody Aircraft (square feet)	7,668	12,000	12,000	12,000	12,000
Narrowbody Aircraft (square feet)	7,670	8,000	8,000	8,000	8,000
Subtotal (square feet)	15,338	20,000	20,000	20,000	20,000
BAGGAGE CLAIM		**2010**	**2015**	**2020**	**2030**
Claim Frontage (linear feet)	425	363	425	351	447
Claim Units[1] (number)	3	2	3	2	3
Claim Area (square feet)	12,224	9,086	10,620	8,780	11,180
Baggage Service Offices (square feet)	1,124	681	797	659	839
Inbound Bag Area (square feet)	16,353	5,452	6,372	5,268	6,708
Subtotal (square feet)	29,701	15,219	17,789	14,707	18,727
CBP		**2010**	**2015**	**2020**	**2030**
Customs and Border Protection (FIS) (square feet)	-	-	-	-	-
Subtotal (square feet)	-	-	-	-	-
PUBLIC SPACE		**2010**	**2015**	**2020**	**2030**
Ticket Lobby (includes queuing) (square feet)	5,248	4,364	4,812	4,248	6,576
Meeter/Greeter Lobby (square feet)	3,243	1,352	1,491	1,316	2,037
Restrooms - Terminal Area (square feet)	2,753	1,521	1,677	1,480	2,292
Restrooms - Concourse Area (square feet)	3,750	1,818	2,005	1,770	2,740
Secure Circulation (square feet)	13,373	12,000	12,000	12,000	12,000
Sterile Circulation (square feet)	-	-	-	-	-
Other Public Circulation (square feet)	48,135	6,317	6,595	6,244	7,693
Miscellaneous (square feet).	-	2,000	2,050	2,101	2,154
Subtotal (square feet)	76,502	29,372	30,630	29,160	35,492
CONCESSIONS		**2010**	**2015**	**2020**	**2030**
Ground Transportation Services (square feet)	800	273	319	263	335
Concessions: Non-Secure (square feet)	826	1,818	2,005	1,770	2,740
Concessions: Secure (square feet)	14,442	9,072	10,872	10,288	12,936
Loading Dock (square feet)	-	365	365	365	365
Concessions Support (square feet)	4,356	2,723	3,219	3,015	3,919
Subtotal (square feet)	20,424	14,251	16,780	15,701	20,295
SECURITY		**2010**	**2015**	**2020**	**2030**
Passenger Screening Lanes (number)	3	3	3	2	4
Passenger Screening Lane Space (square feet)	9,228	4,500	4,500	3,000	6,000
Baggage Screening Space (square feet)	-	-	-	-	-
Baggage Screening Equipment (EDS)	-	-	-	-	-
Subtotal (square feet)	9,228	4,500	4,500	3,000	6,000
OTHER		**2010**	**2015**	**2020**	**2030**
Non-Public Circulation (square feet)	15,387	16,926	18,618	20,480	22,528
Airport Maintenance (square feet)	-	2,000	2,200	2,420	2,662
Airport Administration (square feet)	12,669	13,936	15,329	16,862	18,549
TSA Administration (square feet)	1,790	1,969	2,166	2,382	2,621
Mechanical/Electrical/Utility (square feet)	-	-	-	-	-
Janitorial/Storage/Shops (square feet)	-	2,000	2,200	2,420	2,662
Non-Airline Tenant (square feet)	3,016	-	-	-	-
Unidentified Areas (square feet)	-	-	-	-	-
Structure/non-net areas (square feet)	42,103	46,313	50,945	56,039	61,643
Subtotal (square feet)	74,965	83,144	91,458	100,604	110,665
Total Square Footage	**258,812**	**186,458**	**203,873**	**203,813**	**240,673**
Total Square Footage (Rounded)	**259,000**	**186,000**	**204,000**	**204,000**	**241,000**

[1] Baggage screening will be accommodated in Terminal A
[2] Baggage screening equipment will be accommodated in Terminal A

Table 5-9: Future Terminal C – Revised Facility Requirements

	Terminal C	Forecast Demand			
AIRLINE PROCESSOR AREAS	**Baseline**	**2010**	**2015**	**2020**	**2030**
Agent Positions (number)	-	-	-	-	14
Ticket Counter Length (linear feet)	-	-	-	-	70
Ticket Counter Area (square feet)	-	-	-	-	700
ATO Offices (square feet)	-	-	-	-	3,416
Airline Operations Space (square feet)	-	-	-	-	3,491
Baggage Makeup Area (square feet)	-	-	-	-	8,540
Airline Clubs (square feet)	-	-	-	-	2,135
Subtotal (square feet)	-	-	-	-	18,281
AIRCRAFT GATES		**2010**	**2015**	**2020**	**2030**
Widebody Aircraft (number)	-	-	-	-	-
Large Narrowbody Aircraft (number)	-	-	-	-	-
Narrowbody Aircraft (number)	-	-	-	-	6.0
Subtotal (number)	-	-	-	-	6.0
Equivalent Aircraft (EQA) Index	-	-	-	-	8.4
HOLDROOMS		**2010**	**2015**	**2020**	**2030**
Widebody Aircraft (square feet)	-	-	-	-	-
Large Narrowbody Aircraft (square feet)	-	-	-	-	-
Narrowbody Aircraft (square feet)	-	-	-	-	12,000
Subtotal (square feet)	-	-	-	-	12,000
BAGGAGE CLAIM		**2010**	**2015**	**2020**	**2030**
Claim Frontage (linear feet)	-	-	-	-	622
Claim Units[1] (number)	-	-	-	-	4
Claim Area (square feet)	-	-	-	-	15,560
Baggage Service Offices (square feet)	-	-	-	-	1,167
Inbound Bag Area (square feet)	-	-	-	-	9,336
Subtotal (square feet)	-	-	-	-	26,063
CBP		**2010**	**2015**	**2020**	**2030**
Customs and Border Protection (FIS) (square feet)	-	-	-	-	40,000
Subtotal (square feet)	-	-	-	-	40,000
PUBLIC SPACE		**2010**	**2015**	**2020**	**2030**
Ticket Lobby (includes queuing) (square feet)	-	-	-	-	5,124
Meeter/Greeter Lobby (square feet)	-	-	-	-	1,587
Restrooms - Terminal Area (square feet)	-	-	-	-	1,786
Restrooms - Concourse Area (square feet)	-	-	-	-	2,135
Secure Circulation (square feet)	-	-	-	-	9,000
Sterile Circulation (square feet)	-	-	-	-	12,750
Other Public Circulation (square feet)	-	-	-	-	5,890
Miscellaneous (square feet).	-	-	-	-	2,000
Subtotal (square feet)	-	-	-	-	40,271
CONCESSIONS		**2010**	**2015**	**2020**	**2030**
Ground Transportation Services (square feet)	-	-	-	-	467
Concessions: Non-Secure (square feet)	-	-	-	-	2,135
Concessions: Secure (square feet)	-	-	-	-	4,296
Loading Dock (square feet)	-	-	-	-	365
Concessions Support (square feet)	-	-	-	-	1,608
Subtotal (square feet)	-	-	-	-	8,870
SECURITY		**2010**	**2015**	**2020**	**2030**
Passenger Screening Lanes (number)	-	-	-	-	3
Passenger Screening Lane Space (square feet)	-	-	-	-	4,500
Baggage Screening Space (square feet)	-	-	-	-	5,000
Baggage Screening Equipment (EDS)	-	-	-	-	2
Subtotal (square feet)	-	-	-	-	9,500
OTHER		**2010**	**2015**	**2020**	**2030**
Non-Public Circulation (square feet)	-	-	-	-	17,000
Airport Maintenance (square feet)	-	-	-	-	1,750
Airport Administration (square feet)	-	-	-	-	10,000
TSA Administration (square feet)	-	-	-	-	2,000
Mechanical/Electrical/Utility (square feet)	-	-	-	-	21,000
Janitorial/Storage/Shops (square feet)	-	-	-	-	2,000
Non-Airline Tenant (square feet)	-	-	-	-	1,000
Unidentified Areas (square feet)	-	-	-	-	-
Structure/non-net areas (square feet)	-	-	-	-	13,500
Subtotal (square feet)	-	-	-	-	68,250
Total Square Footage	-	-	-	-	223,236
Total Square Footage (Rounded)	-	-	-	-	223,000

[1] "Other" areas are estimated.

Landside

The terminal area roadways and curbs currently being constructed should be able to accommodate forecast demand through 2030. However, the public and employee parking lots will need to be expanded to accommodate 2030 demand. It is also recommended that rental car facilities be consolidated in one facility co-located with hourly parking. The hourly garage would be retained and a six-level structure would be added to the west, along with multiple levels filled in between the existing garages. The employee parking lot would be relocated south of Loop 410 to reserve land in close proximity to the terminal complex for revenue-producing uses. It is also recommended that the economy lot be located south of the proposed rental car support area, and that the parcel currently used for economy parking be used for commercial development.

The existing rail corridor along Wetmore Road was identified as a potential method to connect passengers between the rail station and the terminal. The least expensive approach would be to develop a passenger platform along the existing rail line that would be supplemented by busing operations to the terminal facility. A more expensive approach would be to build a fixed guideway connection from the rail platform to the terminal area. An APM or PRT system could be implemented for faster, computer-controlled transitions to/from the rail platform. Also, APM or PRT stations could be added along the guideway route to provide access between the terminal and the economy and employee parking lots.

Air Cargo

The existing belly freight facilities are expected to be adequate through 2030; however, the all-cargo facilities would require several infrastructure improvements. The forecast long-term demand would require a major expansion of the cargo complex. The existing air cargo site on the northeast side of the Airport is recommended for further development, as other on-Airport sites are limited by environmental constraints and previously planned development.

Short-term improvements include moving all general aviation overflow parking out of the cargo area.

To meet long-term requirements, a new cargo apron would be contructed north of the existing facilities, supplemented by an extension of Taxiway Q. All facilities would be designed to meet ADG V criteria.

General Aviation

The existing GA facilities are distributed throughout the Airport and the primary focus of the GA analysis was to consolidate these facilities at a site that is separate from commercial passenger and air cargo operations. The northwest side of the Airport provides the most feasible site for GA operations given the land requirements for existing GA facilities and advantages of the preferred site. The existing GA facilities of FBO Nayak Aviation, Silver Ventures, Tesoro, and Stargazer would be relocated from the existing passenger terminal area to the preferred site once their respective leases expire. Additionally, the Security Airpark parcel would be reconfigured for FBO use, including GA Customs and Immigration facilities.

Airline and Airport Support

It is recommended that tenant GSE storage and maintenance functions be expanded in the West Cargo Building, as several vacant bays have been identified in this facility, which could be used to meet 2030 requirements.

The existing fuel farm for commercial passenger and all-cargo aircraft on the south side of the Airport should be expanded to the south to accommodate demand through 2030. Forecast aircraft activity does not justify the cost of developing a hydrant fuelling system at the passenger terminal or air cargo apron.

The existing ARFF station is adequately sized to meet forecast demand through the planning period. Furthermore, the existing ARFF site complies with FAR Part 139 response requirements for the recommended future airfield configuration. However, it is recommended that the ARFF training facility be relocated to use the existing site for aviation-related development.

The Airport maintenance facilities are currently undersized and should be relocated north of the airfield immediately west of the ARFF station, on a currently undeveloped site.

The existing FAA facilities are expected to be adequate through the planning period; however, additional analysis should be considered to upgrade/relocate the ATCT to a more suitable location separate from the passenger terminal and other public areas.

The City conducted a study in 2008 to determine the space requirements for a consolidated Airport administrative facility. The recommended site for this recommended facility is adjacent to U.S. 281 and Terminal Drive in the terminal area.

The Aviation Department has identified the need for a remote centralized concessions receiving/distribution center to coordinate all Airport deliveries. The recommended site for the facility is west of the SAA facilities.

Aircraft Maintenance and Manufacturing Facilities

Space requirements for MRO and aircraft manufacturing facilities are driven by specific tenant demands. It is recommended that the parcels designated as “commercial aviation” on Figure 5-54 be used for expansion of the existing MRO and aircraft manufacturing facilities.

Additionally, several off-Airport properties were identified for potential long-term property acquisition that could support air cargo operations, aircraft maintenance facilities, and commercial development.

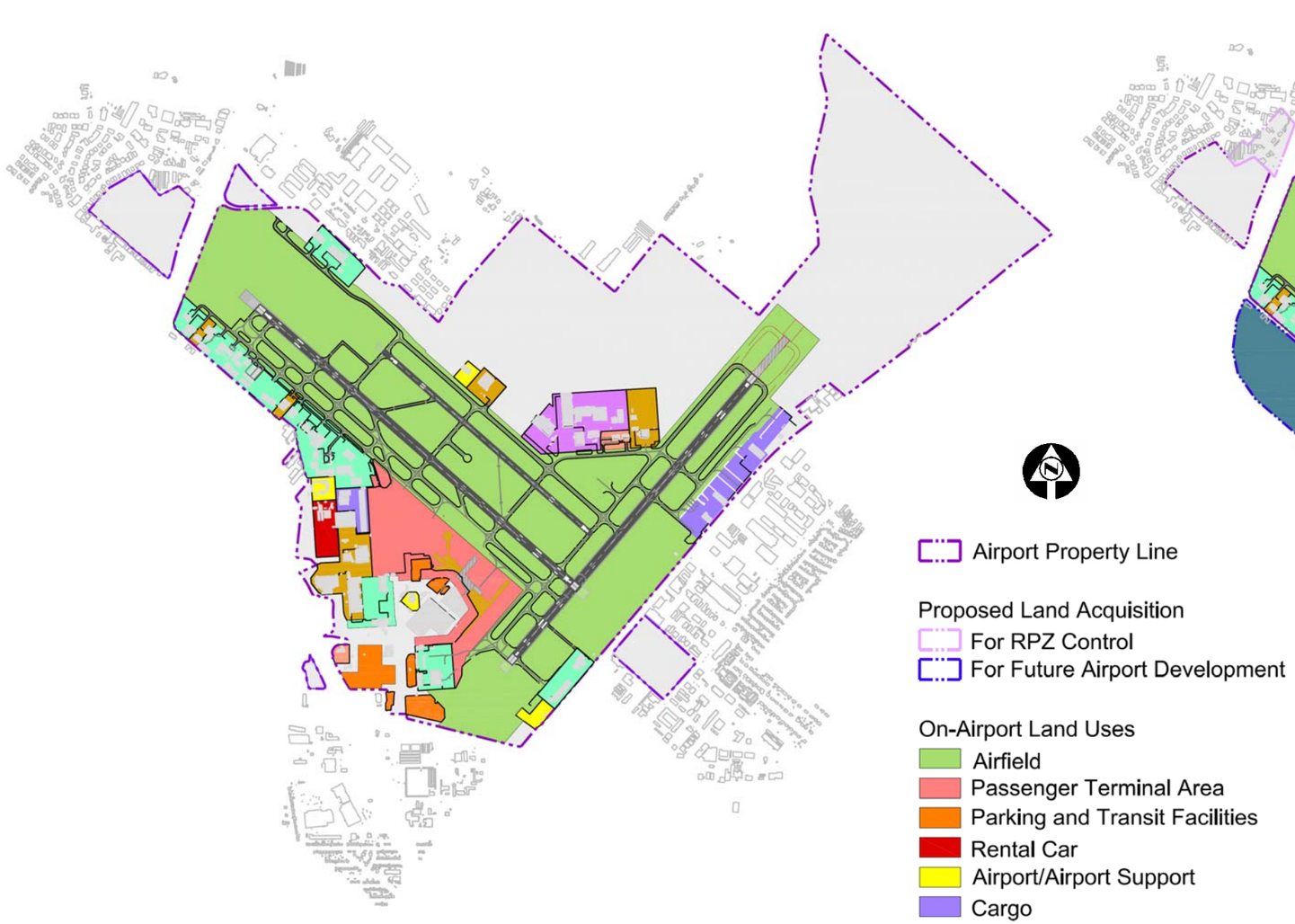
Airport Land Use

Figure 5-62 illustrates the existing and future on-Airport land uses. The figure identifies land use “envelopes” for accommodating the major Airport functions. The purpose of the future on-Airport land use plan is to identify the highest and best use of Airport property given other Master Plan recommendations, surrounding off-Airport uses, existing and future infrastructure, environmental constraints, and strategic considerations.

Figure 5-62: Existing and Future On-Airport Land Uses

Existing On-Airport Land Uses

Future On-Airport Land Uses



Airport Property Line

Proposed Land Acquisition
- For RPZ Control
- For Future Airport Development

On-Airport Land Uses
- Airfield
- Passenger Terminal Area
- Parking and Transit Facilities
- Rental Car
- Airport/Airport Support
- Cargo
- General Aviation
- Aircraft Manufacturing
- Aircraft Maintenance
- Aviation Development
- Commercial Development
- Education
- Airport - Other